ORDER NO. VRD8701202

Service Manual

Editing Video Cassette Recorder

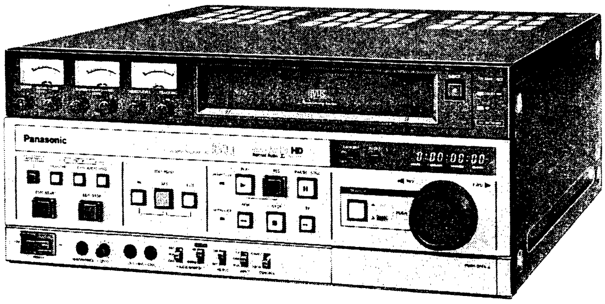
Panasonic/National

VHS Hi-Fi

PAL

AG-6500-E -B -A -EN

Operating Instructions
Circuit Descriptions
Electrical Adjustment Procedures
Mechanical Adjustment Procedures
Block Diagrams
Schematic Diagrams
Circuit Board Diagrams
Exploded Views
Replacement Parts List



SPECIFICATIONS

ITEM	SPECIFICATION
Power	Source: AC110/120/220/240V (Selectable)
	Consumption: Approx. 70W Approx. 75W (with AG-A650)
Video	Head: 4 rotary head, helical scanning system 2 flying (rotary) erase heads
	Luminance: FM azimuth recording
	Colour signal: Converted subcarrier phase shift recording
	Input Level: VIDEO IN (BNC): 1.0Vp-p 75Ω unbalanced TV Monitor connector (8P): 1.0Vp-p 75Ω 1.0Vp-p Dubbing in Connector (7P): chroma level 0.9Vp-p, 1kΩ unbalanced luminance level 1.0Vp-p, 1kΩ unbalanced Composite sync (BNC): 4.0V, negative pulse, 75Ω unbalanced
	Output Level: VIDEO OUT connector (BNC): 1.0Vp-p 75Ω unbalanced TV Monitor connector (8P): 1.0Vp-p 75Ω unbalanced Dubbing Out connector (7P): chroma level 0.9Vp-p, 1kΩ unbalanced luminance level 1.0Vp-p, 1kΩ unbalanced DOC Out (BNC): 0.5Vp-p, 75Ω unbalanced
	Signal-to-Noise Ratio: 45dB
	Horizontal Resolution: Colour: 250 lines B/W: 300 lines

ITEM	SPECIFICATION
Audio	Head: Normal Audio/Control: 1 stationary head HD Audio: 2 rotary heads Erase: 1 full track erase 1 audio track erase
	Track: 2 track (Normal-stereo), 2 channels (HD sound-stereo)
	Input Level: LINE IN (phono × 2): −8dBV 47kΩ unbalanced MIC IN (1/4″ phone × 2): −60dBV 4.7kΩ unbalanced TV Monitor connector (8P): −20dBV 47kΩ unbalanced
	Output Level: LINE OUT (phono × 2): −8dBV 600Ω unbalanced AUDIO MONITOR OUT jack (PHONO): 0dBV 600Ω unbalanced TV Monitor connector (8P): 0dBV 600Ω unbalanced HEADPHONES jack: −60dBV∼−20dBV 8Ω unbalanced
	Frequency Response: Normal: 50Hz∼12kHz HD Sound: 20Hz∼20kHz
	Dynamic Range: Normal: 50dBV (NR ON) HD Sound: 90dBV
	Signal-to-Noise Ratio: 50dBV (Normal NR ON)
Time Code	Input Level (phono) 1Vp-p, 10kΩ unbalanced
	Output Level (phono) 2.4Vp-p, low impedance unbalanced

(Please see reverse side)

Specifications are subject to change without notice.
Weight and dimensions shown are approximate.

Panasonic/National

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

(Continued from cover page)

ITEM	SPECIFICATION	ITEM	SPECIFICATION
Television System	CCIR Standard (625 lines, 50 fields) PAL Colour Signal	Operating Condition	5°C~40°C (Temperature) 35%~85% (Humidity)
Tape Speed	23.39 mm/sec Record/Playback Time: 180 min. with NV-E180 FF/REW Time: Approx 3 min. with NV-E180	Dimention	430(W) × 176(H) × 453(D) mm
Tape Format	Tape width 1/2" (12.7 mm) high density tape	Weight	46.2lbs. (21 kg)

Specifications are subject to change without notice.
Weight and dimensions shown are approximate.

INTRODUCTION

This Service Manual contains all the technical information which will allows service personnels to understand and service the Panasonic/National PAL VHS editing video cassette recorder model AG-6500-E/B/A/EN.
The AG-6500-E/B/A/EN has many special features as described later.
Added to the basic PAL VHS format, these features make the AG-6500 an ideal unit for business, education, sales and training applications.

CONTENTS

- SPECIFICATIONS .... Cover
- CAUTION (FOR YOUR SAFETY) 2
- INSPECTION, OUTLINE, FEATURES 3
- CONTROLS AND THEIR FUNCTIONS 4
- DIMENSIONS 7
- CONNECTING TO THE AUDIO INPUT JACKS 8

- 1. MECHANICAL SECTION
  - 1-1. MAJOR MECHANICAL PARTS AND FUNCTION (TOP SIDE) 1-1
  - 1-2. MAJOR MECHANICAL PARTS AND FUNCTION (BOTTOM SIDE) 1-2
  - 1-3. MAJOR PARTS AND FUNCTION 1-2
- 2. SYSTEM CONTROL SECTION
  - 2-1. SERIAL DATA TRANSMISSION SYSTEM INTRODUCTION 1-3
  - 2-2. SYSTEM CONTROL CIRCUIT (1) 1-9
  - 2-3. SYSTEM CONTROL CIRCUIT (2) 1-13
  - 2-4. KEY BOARD CIRCUIT 1-22
  - 2-5. INTERFACE CIRCUIT 1-27
  - 2-6. REMOTE SEARCH CONTROL 1-28
- 3. SERVO SECTION
  - 3-1. SERVO (1) CIRCUIT (REF. NO. 2000 SERIES) 1-29
  - 3-2. SERVO (2) (FRAMING) CIRCUIT (REF. NO. 2000 SERIES) 1-42
  - 3-3. COLOUR FRAMING CIRCUIT (REF. NO. 2500 SERIES) 1-51
- 4. REEL SECTION (REF. NO. 2700 SERIES)
  - 4-1. GENERAL DESCRIPTION 1-58
  - 4-2. CIRCUIT DESCRIPTION 1-59
- 5. VIDEO SECTION
  - 5-1. GENERAL DESCRIPTION 1-64
  - 5-2. VIDEO CIRCUIT (LUMINANCE CIRCUIT) (REF. NO. 3000 SERIES) 1-66
  - 5-3. CHROMINANCE SECTION (REF. NO. 8000 SERIES) 1-73
- 6. AUDIO SECTION
  - 6-1. AUDIO INPUT SELECT CIRCUIT 1-77
  - 6-2. NORMAL AUDIO RECORDING PROCESS 1-79
  - 6-3. NORMAL AUDIO PLAYBACK PROCESS 1-83
  - 6-4. TIME CODE CIRCUIT 1-86
  - 6-5. HD AUDIO CIRCUIT 1-89
  - 6-6. AUDIO OUTPUT CIRCUIT 1-103

- REGULAR MAINTENANCE 2-1
- DISASSEMBLY PROCEDURES 2-3
- MECHANICAL ADJUSTMENT PROCEDURES 2-8
- 1. SERVICING FIXTURES & TOOLS 2-8
- 2. CYLINDER MAINTENANCE PROCEDURES 2-9
- 3. TAPE INTERCHANGEABILITY ADJUSTMENT PROCEDURES 2-11
  - 3-1. ADJUSTMENT FLOW CHART 2-11
  - 3-2. ADJUSTMENT PROCEDURES 2-12
- 4. OTHER MECHANICAL ADJUSTMENT PROCEDURES 2-18
  - 4-1. ADJUSTMENT OF THE SUB-LOADING ARM UNIT 2-18
  - 4-2. ADJUSTMENT OF THE SAFETY SWITCH 2-19
  - 4-3. TENSION POSTS POSITION ADJUSTMENT 2-19
  - 4-4. SUPPLY & TAKE-UP BRAKE SOLENOID ADJUSTMENT 2-20
  - 4-5. CONFIRMATION/ADJUSTMENT OF THE BRAKE TORQUE 2-21
  - 4-6. CONFIRMATION OF THE F.F. TORQUE 2-21
  - 4-7. CONFIRMATION OF THE REW TORQUE 2-22
  - 4-8. MEASUREMENT AND ADJUSTMENT OF THE BACK TENSION 2-22
  - 4-9. ADJUSTMENT OF THE REEL TABLE HEIGHTS 2-23
  - 4-10. ADJUSTMENT OF CAM GEAR 2-23
- ELECTRICAL ADJUSTMENT PROCEDURES 2-27
- 1. TEST AND SERVICE EQUIPMENT 2-27
- 2. ADJUSTMENT PROCEDURES 2-27
  - 2-1. HOW TO READ THE ADJUSTMENT PROCEDURES 2-27
  - 2-2. SERVO SECTION 2-27
  - 2-3. SYSTEM CONTROL SECTION 2-29
  - 2-4. LUMINANCE, CHROMINANCE & HEAD AMP SECTION 2-30
  - 2-5. NORMAL AUDIO SECTION 2-37
  - 2-6. HD AUDIO SECTION 2-39
- LOCATION OF TEST POINTS & CONTROLS 2-42

- BLOCK DIAGRAMS 3-1
  - OVERALL 3-1
  - INTERFACE 3-2
  - SYSTEM CONTROL (1) 3-4
  - SYSTEM CONTROL (2) 3-6
  - COLOUR FRAMING 3-9
  - SERVO (2) 3-12
  - SERVO (1) 3-14
  - REEL SERVO 3-17
  - KEY BOARD 3-20
  - VIDEO 3-23
  - CHROMINANCE 3-26
  - AUDIO OVERALL 3-29
  - AUDIO CONTROL 3-32
  - HD AUDIO 3-36
  - NORMAL AUDIO 3-40
- SCHEMATIC & CIRCUIT BOARD DIAGRAMS 3-43
  - POWER SUPPLY 3-43
  - KEY BOARD 3-48
  - SYSTEM CONTROL 3-53
  - INTERFACE 3-63
  - SERVO (1) 3-68
  - SERVO (2) & COLOUR FRAMING 3-73
  - VIDEO 3-81
  - VIDEO HEAD AMP 3-89
  - CHROMINANCE 3-93
  - NORMAL AUDIO 3-99
  - HD AUDIO & HD AUDIO HEAD 3-108
  - FRONT PANEL 3-114
  - FRONT JACK 3-116
  - REAR JACK (2) 3-118
  - REAR JACK (3) 3-121
  - REEL SERVO 3-125
  - INTERCONNECTION 3-130

- EXPLODED VIEWS 4-1
  - 1. TRANSPORT SECTION 4-1
  - 2. MOVING MECHANISM SECTION-(1) 4-2
  - 3. CHASSIS PARTS SECTION 4-3
  - 4. MOVING MECHANISM SECTION-(2) 4-4
  - 5. FRONT LOADING MECHANISM SECTION 4-5
  - 6. CHASSIS FRAME SECTION-(1) 4-6
  - 7. CHASSIS FRAME SECTION-(2) 4-7
  - 8. CASING PARTS SECTION-(1) 4-8
  - 9. CASING PARTS SECTION-(2) 4-9
  - 10. PACKING PARTS SECTION 4-10

FOR YOUR SAFETY

IMPORTANT

"Unauthorized recording of copyrighted television programmes, films, video tapes and other materials may infringe the right of copyright owners and be contrary to copyright laws."

CAUTION:
TO PREVENT FIRE OR SHOCK HAZARD AND ANNOYING INTERFERENCE, USE THE RECOMMENDED ACCESSORIES ONLY.

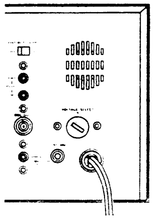
■ THIS APPARATUS MUST BE EARTHED.

To ensure safe operation the three-core lead supplied (not for U.K. model) must be connected only into a standard three-pin power point which is effectively earthed through the normal household wiring.

Extension cords used with the equipment must be three-core and be correctly wired to provide connection to earth. Wrongly wired extension cords are a major cause of fatalities.

The fact that the equipment operates satisfactorily does not imply that the power point is earthed and that the installation is completely safe. For your safety, if in any doubt about the effective earthing of the power point, consult a qualified electrician.

■ VOLTAGE SELECTOR SETTING



The power cord must be disconnected from mains before the voltage selector setting is changed.

AG-6500 can be used on either 110, 120, 220, or 240V AC.

AG-6500-E and -EN are preset to 220V at the factory.

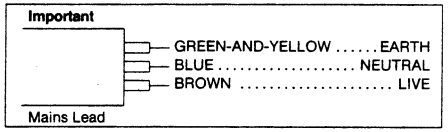
AG-6500-A and -B are preset to 240V at the factory.

Before connecting to the power supply, ensure that the selector on the rear panel is selected to the same voltage as your local power supply.

The voltage selector can be adjusted, if necessary, by using a screwdriver, but this adjustment must be made after disconnecting the power cord.

■ AC POWER CORD CONNECTION (AG-6500-B only)

The wires in the mains lead for this apparatus are coloured in accordance with the following code.


Important
GREEN-AND-YELLOW ...... EARTH
BLUE .... NEUTRAL
BROWN .... LIVE
Mains Lead

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol ⏚ or coloured GREEN or GREEN-AND-YELLOW.

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured black.

The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured red.

Remark:

This apparatus was produced to BS 800: 1983.
Dieses Modell entspricht der EG-Vorschrift (für Funkstörungsschutz) 82/499/EG.
La Société PANASONIC-FRANCE, importateur du matériel MATSUSHITA-JAPON déclare que cet appareil est conforme aux prescriptions de la directive 76/889/C.E.E. modifiée par la directive 82/499/C.E.E.
Dit model is onderworpen aan de EEG-richtlijn (ter voorkoming van radio-interferentie) 82/499/EEG.
Denne model opfylder EF direktiv 82/499/EF (for forebyggelse af radiointerferens).
La Società PANASONIC ITALIA S.p.A., importatrice di questo prodotto, dichiara che questo apparecchio è conforme alle disposizioni della direttiva C.E.E./82/499 (D.M. 10 aprila 1984).

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

▨▨▨ is the safety information.

INSPECTION

Optional Accessories

- Video Cassette Tape
- Dubbing Cable (7-pin) (AG-C65)
- TV/VTR Connecting Cable (8-pin)
- Editing Controller (AG-A650/NV-A500/NV-A960)
- Remote Search Controller (NV-A505)
- Remote Controller (AG-A600)
- Multi-Source Switcher (NV-J500)
- Rack-Mounting Adaptor (AG-M650)

OUTLINE

The model AG-6500 Editing Video Cassette Recorder has been developed for industrial applications, as well as for schools and studios. It employs a 2-reel motor drive method, DD cylinder, DD capstan, rotary erase head and the use of a highly reliable mechanism, making for a more stable and clearer image, and permitting high grade editing by means of simple operations.

By connecting the AG-A650 Editing Controller to the AG-6500, you can fully utilize the editing functions of the AG-6500 and perform more accurate editing by automatic operation. You can also create an editing system by connecting the unit to the NV-A500 or NV-A960 Editing Controller.

FEATURES

1. High quality picture

This unit contains a white clip, detail enhancer circuit, resulting in a sharper picture than that obtainable with a conventional VHS.

2. H-aligned framing servo

Sometimes, when editing video signals conforming to the CCIR standard, frame phase misalignment or horizontal distortion occurs between adjacent edited portions. This unit employs a framing servo to align the frames, thus eliminating such errors at the edit start and end points.

3. Flying erase-based editing

The adoption of a "rotary erase head" makes it possible to achieve top-grade electronic editing without noise or frame mis-synchronization.

4. Recording and playback of Hi-Fi sound (HD sound) and assemble editing

You can record and play back HD Sound even without a video input signal. You can also independently record a total of four channels, that is, HD Sound (CH1/CH2) and Normal Audio CH1/CH2.

5. Dual audio channel·Dolby* NR system

Because there are two audio tracks, stereo or bilingual programmes can be recorded and played back. The sound quality is further improved due to the built-in Dolby NR system.

6. JOG/SHUTTLE search function using dial

A programme segment on the tape can be speedily and accurately found by using a SHUTTLE search in which the tape speed is varied between 0 and 10 times the normal speed, or a JOG search in which the tape speed is varied in accordance with the rotational speed of the dial.

7. Field still function

This function provides attractive still pictures with minimal jitter.

8. Rack mounting possible due to front loading

The unit is a cassette tape insertion type employing front loading, hence it can be easily installed in an IEC standard 19-inch rack.

9. Interim loading system

The incorporation of an interim loading system makes it possible to read out control signals even during tape rewind or fast forward tape travel.

10. 2-reel motor drive system

The completely belt-less drive mechanism makes for stable tape travel and permits more accurate editing.

11. Electronic counter

When the tape starts moving, the control signals recorded on the tape are counted. Since the hours, minutes, seconds and frames are indicated, it is easy to set the edit start and end point accurately.

12. Editing and dubbing connectors

Special connectors designed for dubbing provide improved picture quality when dubbing or editing between video recorders.

13. Audio and video tracking level meters

Three level meters, for audio CH1, audio CH2, and video/tracking, respectively, are provided for precise level adjustment.

14. Time code recording and playback

The EBU time code can be recorded and played back on the audio CH2 track.

15. Independent editing

When the AG-6500 is used independently as an editor and the edit start and end points are memorized in the tape counter, editing automatically takes place between those points.

16. System editing

An editing system can be configured by connecting the AG-6500 to an Editing Controller (AG-A650, option).

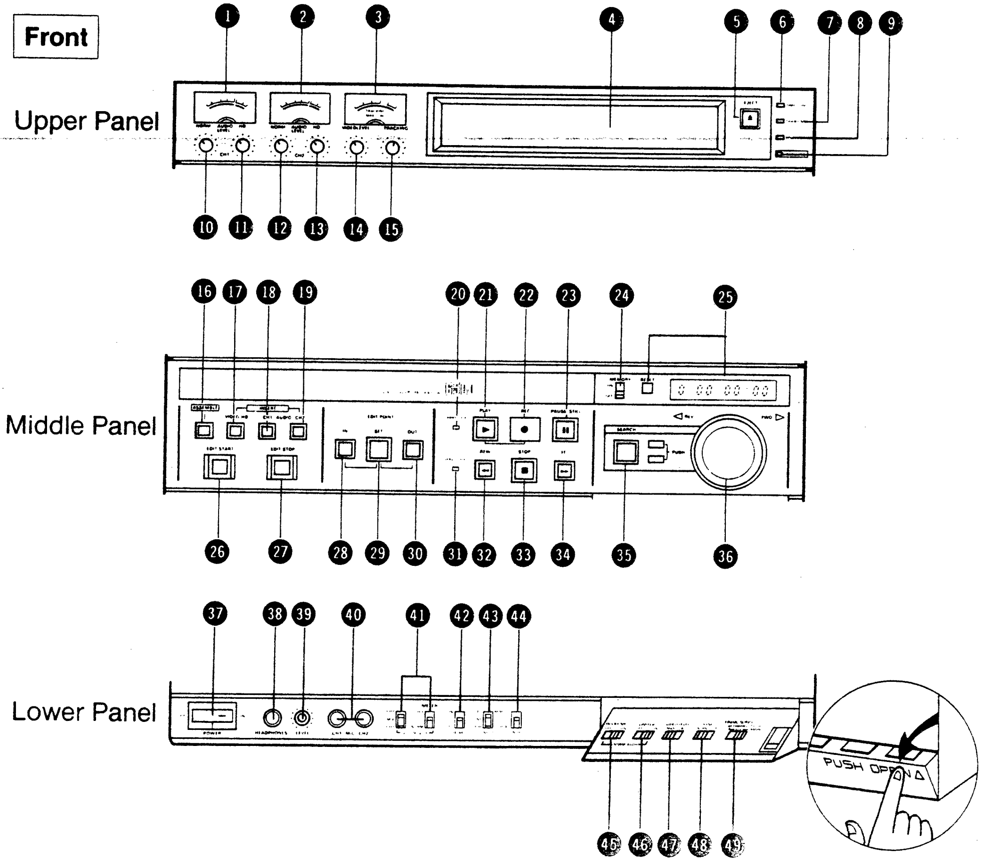
- Up to three source (playback) units can be connected simultaneously by using a Remote Search Controller (NV-A505, option) and Multi-Source Switcher (NV-J500, option).
- It is possible to configure a system by connecting the unit to the NV-A500 or NV-A960 Editing Controller (options).

17. Other features

- Headphone level control function
- Auto rewind function
- Built-in hourmeter

* 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
* Noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.

CONTROLS AND THEIR FUNCTIONS



① **Audio (CH1) Level Meter**

② **Audio (CH2) Level Meter**

③ **Video Level/Tracking Meter**

④ **Cassetter Holder**

⑤ **Eject Button**

⑥ **Time Code Lamp**

⑦ **Dolby NR Lamp**

⑧ **HD Lamp**

⑨ **Auto OFF Lamp**
This lamp lights if moisture condenses inside the unit. It blinks when something is wrong with the tape transport (such as tape slack). If this lamp lights or blinks, the unit will stop.

⑩ **Audio (CH1) Normal Audio Level Control**

⑪ **Audio (CH1) HD Sound Level Control**

⑫ **Audio (CH2) Normal Audio Level Control**

⑬ **Audio (CH2) HD Sound Level Control**

⑭ **Video Level Control**

⑮ **Tracking Control**

⑯ **Assemble Button/Lamp**

⑰ **Insert Video/HD Button/Lamp**

⑱ **Insert Audio CH1 Button/Lamp**

⑲ **Insert Audio CH2 Button/Lamp**

⑳ **Frame Lock Lamp**
This lamp lights when the CCIR standard signal is synchronized with the frame during playback or recording.
Before performing editing, confirm that this lamp is lit.

㉑ **Play Button/Lamp**

㉒ **Record Button/Lamp**

㉓ **Pause/Still Button/Lamp**

㉔ **Memory Switch**

㉕ **Tape Counter/Reset Button**

㉖ **Edit Start Button/Lamp**
This button is used for performing editing (assemble editing or insert editing) after the editing point is set. While editing is taking place, the lamp lights; while a search is taking place at the edit start point and also when the tape returns to the edit end point the lamp blinks.
If you press the Edit Start Button without setting the edit point, you can start editing from the point where you pressed the button.

㉗ **Edit Stop Button**
If you press this button during editing, the editing will be finished at the point where you pressed the button.

㉘ **Edit Point In Button/Lamp**
By pressing this button together with the Set Button, you can set the edit start point.
When the button is pressed, the lamp will light, indicating that the edit start point has been set. By pressing the In Button after setting the edit start point, the edit start point will be displayed on the tape counter. Also, by pressing the Out Button together with the In Button, the editing time will be displayed on the tape counter.
After the end of editing, the lamps of the In Button and Out Button will blink simultaneously, indicating that editing has ended.

㉙ **Editing Point Setting Button**
By pressing this button together with the In or Out Button, you can set the editing points.

㉚ **Edit Point Out Button/Lamp**
By pressing this button together with the Set Button, you can set the edit end point. When the button is pressed, the lamp will light, indicating that the edit end point has been set. By pressing the Out Button after setting the edit end point, the edit end point will be displayed on the tape counter. Also, if you press the In Button and Out Button simultaneously, the editing time will appear on the tape counter. After the end of editing, the lamps of the Out Button and In Button will blink simultaneously, indicating that editing has ended.

㉛ **Servo Lock Lamp**

㉜ **Rewind Button/Lamp**

㉝ **Stop Button/Lamp**

㉞ **Fast Forward Button/Lamp**

㉟ **Search Button/Lamp**

㊱ **Search Dial**

㊲ **Power Switch**

㊳ **Headphone Jack (1/4" Phone)**

㊴ **Headphone Level Control**

㊵ **Microphone CH1/CH2 Jacks (1/4" Phone)**

㊶ **Audio Monitor Selector**
These selectors are used for selecting the type of audio which is output from TV Monitor (8-pin) Connector ⑮ (Rear Panel), Audio Monitor Output Jack ⑤ (Rear Panel) and Headphone Jack ㊳, and the channel to be monitored. The indication of Audio Level Meter ①, ② can be switched between Normal/HD by means of the meter side of these selectors.

㊷ **HD Recording Switch**

㊸ **Input Signal Selector**

㊹ **Control Selector (Remote/Local)**
REMOTE: Set the switch to this position when connecting a controller to the Remote Control Connector ⑩ (Rear Panel). When the switch is in this position, the operation buttons on the unit will be rendered inoperative, and the unit will be controlled by the remote controller. Also, the counter cannot be reset. (The Stop Button and Eject Button will function, however.)
LOCAL: Set the switch to this position when using the unit independently.

Note:
When you change the setting of this switch from local to remote, the editing points will be reset.

㊺ **Dolby NR Switch**

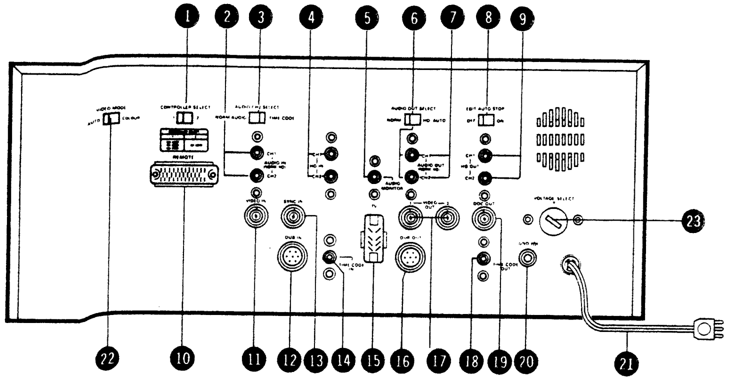
㊻ **Audio Limiter Selector**

㊼ **Video Level Selector**

㊽ **Sync Selector**

㊾ **Frame Servo Switch**
OFF: Recording or editing input signals other than CCIR standard signals.
Set the switch to this position when performing insert editing or assemble editing onto a tape that has been recorded using a VTR which does not have a frame servo function.
When the switch is put in this position, Frame Lock lamp ⑳ will go out.
FRAMING: Recording or editing CCIR standard signals.
When the frame servo is applied, Frame Lock lamp ⑳ will light.
COLOUR FRAMING: Recording or editing CCIR PAL COLOUR signals. When the colour frame servo is applied, Frame Lock lamp ⑳ will light.

Rear


1
2
3
4
5
6
7
8
9
23
22
10
11
12
13
14
15
16
17
18
19
20
21

① Controller Select

② Audio Input (CH1/CH2) Jacks

③ Audio CH2 Selector

④ HD Sound Input (CH1/CH2) Jacks

⑤ Audio Monitor Output Jack

⑥ Audio Output Selector

NORM: Normal Audio is output from Audio Output Jacks ⑦.

HD/AUTO: If HD Sound is recorded, HD Sound will be output. If HD Sound is not recorded on the tape, Normal Audio will be automatically output from Audio Output Jacks ⑦.

⑦ Audio Output (CH1/CH2) Jacks

⑧ Edit Automatic Stop Selector

By putting this selector in the "ON" position, the VTR will automatically stop in the event that a servo disturbance occurs at the edit start point.

⑨ HD Sound Output (CH2) Jacks

⑩ Remote Control Connector

⑪ Video Input Connector

⑫ Dubbing Input Connector

⑬ Sync Input Connector

⑭ Time Code Input Jack

⑮ TV Monitor (8-pin) Connector

⑯ Dubbing Output Connector

⑰ Video Output Connector

⑱ Time Code Output Jack

⑲ DOC Output Connector

Connect this to the DOC Input terminal of a time base corrector. When it is connected, a dropout detection RF signal will be output.

⑳ Ground Terminal

㉑ Power Cord

㉒ Video Mode Selector

Set this selector normally at "AUTO" position.

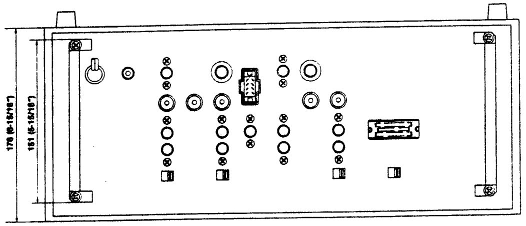
AUTO: To record either Colour or Black & White video input signal by distinguishing automatically between them.

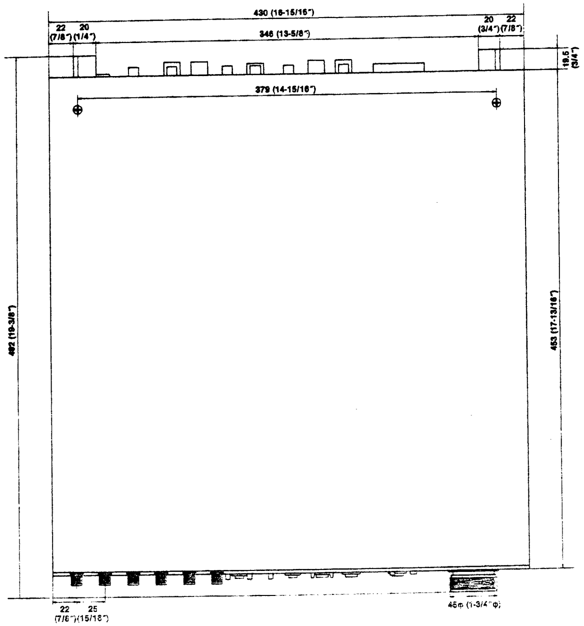
COLOUR: When the colour image is unstable, use this position for stabilizing the colour image.

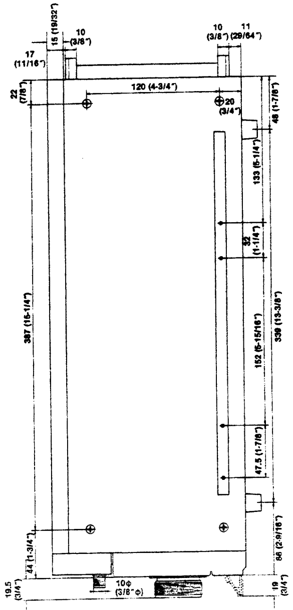
Note:
Expecially if the colour image is unstable during the search operation of the 10 times the normal playback speed, set this selector to the "COLOUR" position if desired the colour image.

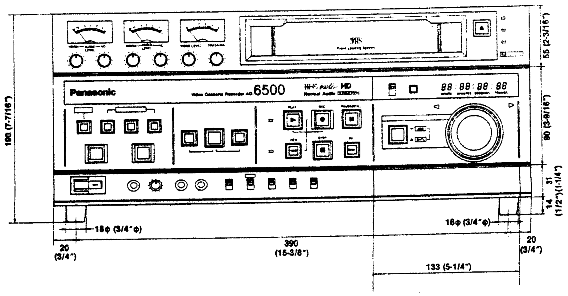
㉓ Voltage Selector

DIMENSIONS


178 (6-15/16")
161 (6-15/16")

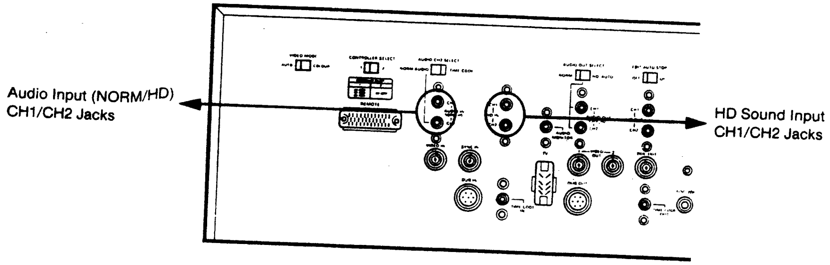

430 (16-15/16")
346 (13-5/8")
22 20 (7/8")(1/4")
20 22 (3/4")(7/8")
379 (14-15/16")
19.5 (3/4")
492 (19-3/8")
453 (17-13/16")
22 25 (7/8")(15/16")
46φ (1-3/4"φ)


15 (19/32")
10 (3/8")
17 (11/16")
10 11 (3/8")(29/64")
22 (7/8")
120 (4-3/4")
φ20 (3/4")
48 (1-7/8")
133 (5-1/4")
32 (1-1/4")
387 (15-1/4")
152 (5-15/16")
339 (13-3/8")
47.5 (1-7/8")
44 (1-3/4")
66 (2-9/16")
19.5 (3/4")
10φ (3/8"φ)
18 (3/4")

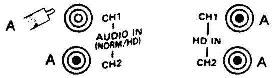

Panasonic
6500
190 (7-7/16")
55 (2-3/16")
90 (3-9/16")
31 (1-1/4")
14 (1/2")
18φ (3/4"φ)
18φ (3/4"φ)
20 (3/4")
390 (15-3/8")
20 (3/4")
133 (5-1/4")

Unit: mm
(inch)

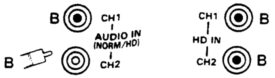
CONNECTING TO THE AUDIO INPUT JACKS


Audio Input (NORM/HD)
CH1/CH2 Jacks
HD Sound Input
CH1/CH2 Jacks

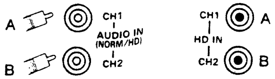
Depending on how the connections are made to the audio input jacks and the HD Sound input jacks, the audio operation will change as shown below, so please keep this in mind in making these connections.


A
CH1
AUDIO IN
(NORM/HD)
CH2
A
CH1
HD IN
CH2
A
A

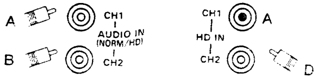
◉ Audio input A automatically inputs to the jacks with the solid circles in the middle.


B
CH1
AUDIO IN
(NORM/HD)
CH2
B
CH1
HD IN
CH2
B
B

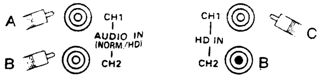
◉ Audio input B automatically inputs to the jack with a solid circle in the middle.


A
CH1
AUDIO IN
(NORM/HD)
CH2
B
CH1
HD IN
CH2
A
B

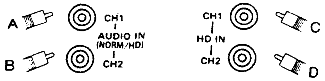
◉ A and B automatically input to the jacks with solid circles in the middle, as shown in the diagram.


A
CH1
AUDIO IN
(NORM/HD)
CH2
B
CH1
HD IN
CH2
A
D

◉ Audio input A automatically inputs to the jack with a solid circle in the middle.


A
CH1
AUDIO IN
(NORM/HD)
CH2
B
CH1
HD IN
CH2
C
B

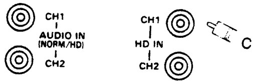
◉ Audio input B automatically inputs to the jacks with solid circles in the middle.

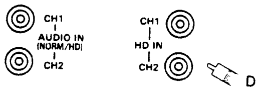

A
CH1
AUDIO IN
(NORM/HD)
CH2
B
CH1
HD IN
CH2
C
D

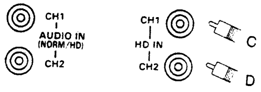
Audio inputs A, B, C and D are direct inputs to the jacks as shown in the diagram.

<Caution>

As shown in the diagrams below, audio inputs connected to the HD Sound input jacks are input only to those jacks. There is no automatic connection to normal audio!


CH1
AUDIO IN
(NORM/HD)
CH2
CH1
HD IN
CH2
C


CH1
AUDIO IN
(NORM/HD)
CH2
CH1
HD IN
CH2
D

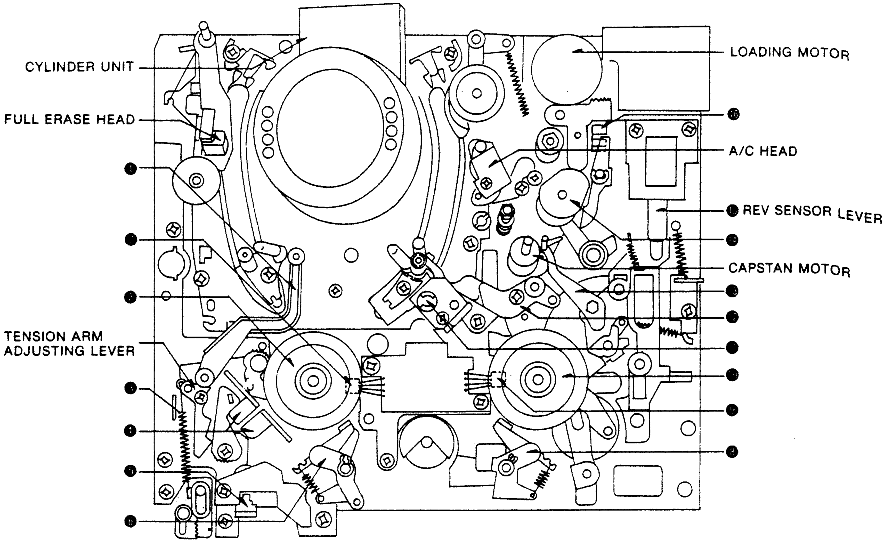

CH1
AUDIO IN
(NORM/HD)
CH2
CH1
HD IN
CH2
C
D

1. Mechanical Section

The AG-6500 is constructed on a VHS chassis, employing six motors for the tape transport mechanism and front loading mechanism, and three solenoids.

These electro-mechanical parts are controlled by six microcomputers. See Figures 1-1, 1-2, 1-3 for the location and function of major parts.

1-1. MAJOR MECHANICAL PARTS AND FUNCTION (TOP SIDE)

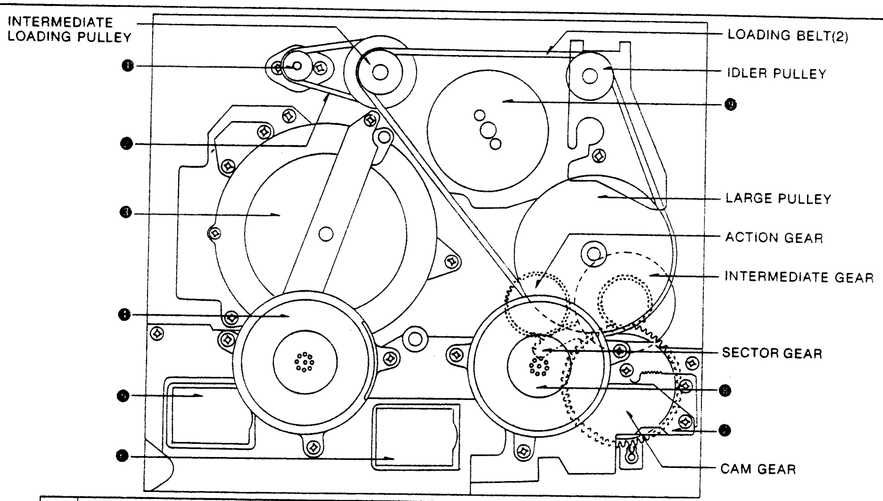

CYLINDER UNIT
FULL ERASE HEAD
TENSION ARM
ADJUSTING LEVER
LOADING MOTOR
A/C HEAD
REV SENSOR LEVER
CAPSTAN MOTOR

REF No.	NAME	FUNCTION
①	TENSION ARM	Thru the reel-servo controlling circuit, it keeps the tape at a constant tension.
②	SUPPLY REEL TABLE	Rewinds the tape during REW and REV SEARCH.
③	TENSION ARM SPRING	Back tension is applied to the tape as it is attached to the Tension Arm.
④	SUPPLY TENSION SENSOR	Detects the tape tension while the tension arm's adjustment lever acts as a shutter to it.
⑤	REC INHIBIT SWITCH	If the cassette's tap is broken, it will prevent erasure of the tape.
⑥	SUPPLY MAIN BRAKE	Acts when the brake of the supply reel is activated at STOP mode.
⑦	SUPPLY HALL IC	Detects the revolution of the supply reel.
⑧	TAKEUP MAIN BRAKE	Acts when the brake of the take-up operates during STOP mode.

REF No.	NAME	FUNCTION
⑨	TAKEUP HALL IC	Detects the revolution of the take-up reel.
⑩	TAKEUP REEL TABLE	Winds the tape during FF and FWD SEARCH modes.
⑪	TAPE END/BEG. SENSOR LHD	This is a detection LED for the beginning and the end of the tape.
⑫	SUB-LOADING ARM	Draws and mid-roll the tape up to the A/C head.
⑬	PULL-OUT ARM (P5 POST)	Controls the position of the tape during REV SEARCH. The reel-servo circuit will control the tension of the take-up tape.
⑭	PRESSURE ROLLER	Subjects the tape to the capstan to enable tape travel.
⑮	PRESSURE SOLENOID	Upon completing the tape loading action, it will subject the pressure roller in the direction of the capstan.
⑯	TAKEUP PHOTO SENSOR	Detects the tension of the tape. The lever (R) acts as its shutter.

Figure 1—1 Major Parts (1)

1–2. MAJOR MECHANICAL PARTS AND FUNCTION (BOTTOM SIDE)

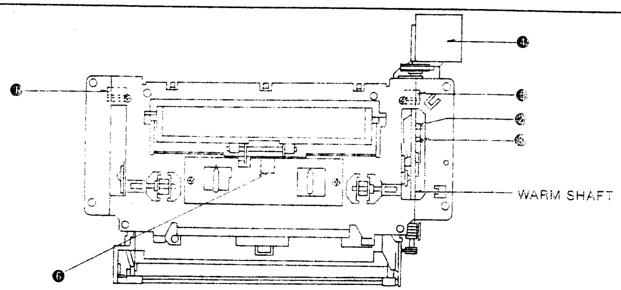

INTERMEDIATE LOADING PULLEY
❶
❸
LOADING BELT(2)
IDLER PULLEY
❾
LARGE PULLEY
ACTION GEAR
INTERMEDIATE GEAR
SECTOR GEAR
❽
❼
CAM GEAR

REF No.	NAME	FUNCTION
❶	LOADING MOTOR	Carries out loading and unloading of the tape. It also carries out mode switchings.
❷	LOADING BELT	Transmits the run of the loading motor.
❸	CAPSTAN MOTOR	Controlled by a servo circuit, it runs the tape at a constant speed during PLAY and REC modes.
❹	TAKEUP REEL MOTOR	Rotates the take-up reel for winding the tape.

REF No.	NAME	FUNCTION
❺	TAKEUP SOLENOID	Cancels the main brake (R) of the take-up reel.
❻	SUPPLY SOLENOID	Cancels the main brake (L) of the supply reel.
❼	MODE SELECT SWITCH	Checks the position of each mode and output to the system controlling circuit.
❽	SUPPLY REEL MOTOR	By rotating the supply reel, it winds the tape.
❾	CYLINDER UNIT	Rotates the Video head.

Figure 1—2 Major Parts (2)

1–3. MAJOR PARTS AND FUNCTION


❹
WARM SHAFT
❻

REF No.	NAME	FUNCTION
❶	SUPPLY PHOTO TRANSISTOR	Detects the beginning and the end of the tape.
❷	F. LOADING DOWN SWITCH	It is at ON when the cassette is ejected.
❸	F. LOADING UP SWITCH	It is at ON when the elevator rests at DOWN position.

REF No.	NAME	FUNCTION
❹	F. LOADING MOTOR	Runs the elevator UP and DOWN.
❺	TAKEUP PHOTO TRANSISTOR	Detects the beginning of the tape.
❻	TAPE IN SWITCH	It is at ON when the tape establishes the regular position.

Figure 1—3 Major Parts (3)

2. System Control Section

2–1. Serial Data Transmission System Introduction

System Control section of this model is provided by a multiple microcomputer system of seven microcomputer IC's which are linked together by a serial transmission bus as shown in Figure 2–1.
The multiple microcomputer system provides for the recognition of inputs from the front panel switches, 34pin remote connector, the internal tranport status, and generates all the output signals for transport mechanism control, tape time display, servo mode selection, reel servo mode selection, colour framing control and etc.

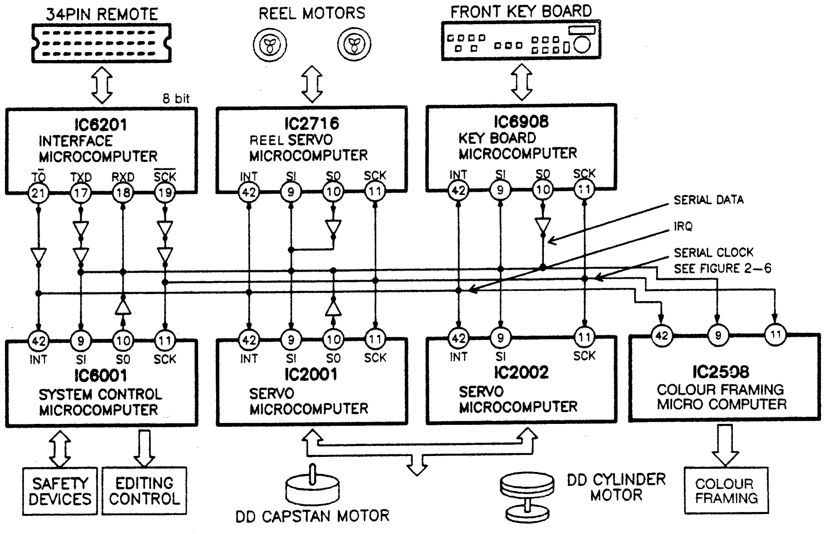

34PIN REMOTE
REEL MOTORS
FRONT KEY BOARD
8 bit
IC6201
INTERFACE
MICROCOMPUTER
TO
TXD
RXD
SCK
21
17
18
19
IC2716
REEL SERVO
MICROCOMPUTER
INT
SI
SO
SCK
42
9
10
11
IC6908
KEY BOARD
MICROCOMPUTER
INT
SI
SO
SCK
42
9
10
11
SERIAL DATA
IRQ
SERIAL CLOCK
SEE FIGURE 2—6
42
9
10
11
INT
SI
SO
SCK
IC6001
SYSTEM CONTROL
MICROCOMPUTER
42
9
10
11
INT
SI
SO
SCK
IC2001
SERVO
MICROCOMPUTER
42
9
11
INT
SI
SCK
IC2002
SERVO
MICROCOMPUTER
42
9
11
IC2508
COLOUR FRAMING
MICRO COMPUTER
SAFETY DEVICES
EDITING CONTROL
DD CAPSTAN MOTOR
DD CYLINDER MOTOR
COLOUR FRAMING

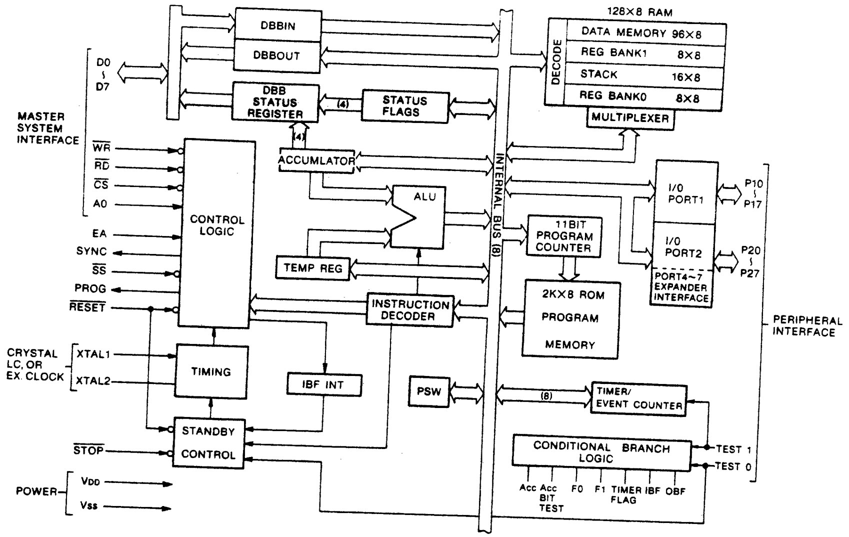
Figure 2—1 Multipule Microcomputer System

1) Microcomputer

The microcomputers for the system control sections are as shown in Figure 2–2.
The block diagrams and pin assignments of the microcomputer are shown in Figures 2–3 and 2–4.

REF No.	PART No.	TYPE OF IC	SECTION(C.B.A)	FEATURE
IC6201	μPD7811G344	μPD7811G	Interface C.B.A.	A 8 bit high performance device which includes 16 bit ALU, ROM, RAM A/D converter, serial interface and timer event counter. ROM : 4096×8 bit RAM : 256×8 bit
IC6001	μPD1512AC131	μPD1512AC	System Control C.B.A.	A 4 bit high performance device which includes ALU, ROM I/O ports and serial interface. ROM : 4080×8 bit RAM : 256×4 bit
IC2716	μPD1511AC106	μPD1511AC	Reel Servo C.B.A.	A 4 bit high performance device which includes ALU, ROM, I/O ports and serial interface. ROM : 2032×8 bit RAM : 128×4 bit
IC6908	μPD1511AC105	μPD1511AC	Key Bourd C.B.A.	
IC2001	μPD1511AC092	μPD1511AC	Servo C.B.A.	
IC2002	μPD1511AC103	μPD1511AC	Servo C.B.A.	
IC2508	μPD1511AC108	μPD1511AC	Colour Framing C.B.A.	

Figure 2—2 Type and Feature of Microcomputers


DBBIN
DBBOUT
DBB STATUS REGISTER
STATUS FLAGS
MASTER SYSTEM INTERFACE
D0 ∫ D7
WR
RD
CS
A0
EA
SYNC
SS
PROG
RESET
CONTROL LOGIC
ACCUMLATOR
ALU
TEMP REG
INSTRUCTION DECODER
INTERNAL BUS (8)
128×8 RAM
DECODE
DATA MEMORY 96×8
REG BANK1 8×8
STACK 16×8
REG BANK0 8×8
MULTIPLEXER
11BIT PROGRAM COUNTER
2K×8 ROM PROGRAM MEMORY
I/O PORT1
I/O PORT2
PORT4~7 EXPANDER INTERFACE
P10 ∫ P17
P20 ∫ P27
PERIPHERAL INTERFACE
CRYSTAL LC, OR EX. CLOCK
XTAL1
XTAL2
TIMING
IBF INT
PSW
TIMER/ EVENT COUNTER
STANDBY CONTROL
STOP
CONDITIONAL BRANCH LOGIC
TEST 1
TEST 0
Acc Acc BIT TEST F0 F1 TIMER FLAG IBF OBF
POWER
VDD
VSS

(Top View)

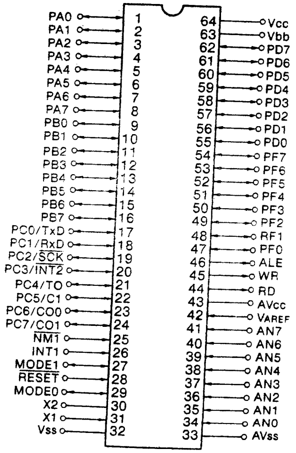
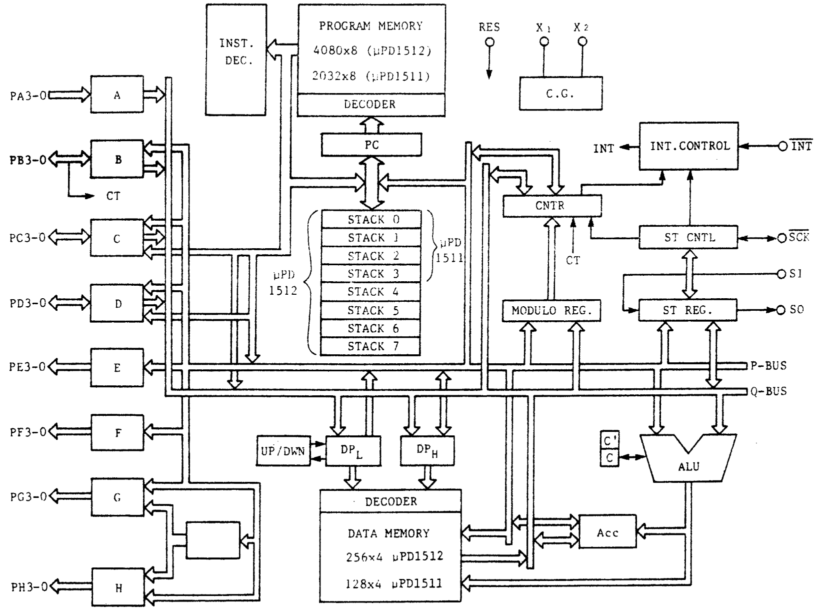
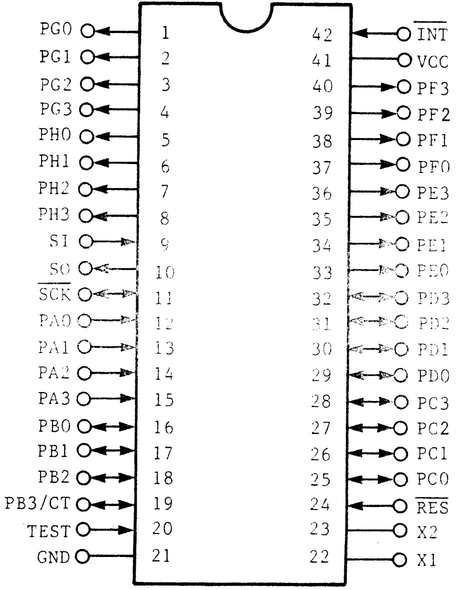

PA0 1
PA1 2
PA2 3
PA3 4
PA4 5
PA5 6
PA6 7
PA7 8
PB0 9
PB1 10
PB2 11
PB3 12
PB4 13
PB5 14
PB6 15
PB7 16
PC0/TxD 17
PC1/RxD 18
PC2/SCK 19
PC3/INT2 20
PC4/TO 21
PC5/C1 22
PC6/CO0 23
PC7/CO1 24
NMI 25
INT1 26
MODE1 27
RESET 28
MODE0 29
X2 30
X1 31
Vss 32
64 Vcc
63 Vbb
62 PD7
61 PD6
60 PD5
59 PD4
58 PD3
57 PD2
56 PD1
55 PD0
54 PF7
53 PF6
52 PF5
51 PF4
50 PF3
49 PF2
48 RF1
47 PF0
46 ALE
45 WR
44 RD
43 AVcc
42 VAREF
41 AN7
40 AN6
39 AN5
38 AN4
37 AN3
36 AN2
35 AN1
34 AN0
33 AVss

Figure 2—3 Block Diagram and Pin Assingment for MPD7811G


INST. DEC.
PROGRAM MEMORY
4080x8 (µPD1512)
2032x8 (µPD1511)
DECODER
PC
RES
X1
X2
C.G.
INT
INT.CONTROL
INT
PA3-0
A
PB3-0
B
CT
PC3-0
C
PD3-0
D
PE3-0
E
PF3-0
F
PG3-0
G
PH3-0
H
STACK 0
STACK 1
STACK 2
STACK 3
STACK 4
STACK 5
STACK 6
STACK 7
µPD 1512
µPD 1511
CNTR
CT
ST CNTL
SCK
SI
SO
MODULO REG.
ST REG.
P-BUS
Q-BUS
UP/DWN
DPL
DPH
C'
C
ALU
DECODER
DATA MEMORY
256×4 µPD1512
128×4 µPD1511
Acc

(TOP VIEW)


PG0 1
PG1 2
PG2 3
PG3 4
PH0 5
PH1 6
PH2 7
PH3 8
SI 9
SO 10
SCK 11
PA0 12
PA1 13
PA2 14
PA3 15
PB0 16
PB1 17
PB2 18
PB3/CT 19
TEST 20
GND 21
42 INT
41 VCC
40 PF3
39 PF2
38 PF1
37 PF0
36 PE3
35 PE2
34 PE1
33 PE0
32 PD3
31 PD2
30 PD1
29 PD0
28 PC3
27 PC2
26 PC1
25 PC0
24 RES
23 X2
22 X1

SI: SERIAL DATA INPUT
SO: SERIAL DATA OUTPUT
$\overline{\text{SCK}}$: SERIAL CLOCK IN/OUTPUT
CT: EVENT COUNTER INPUT
$\overline{\text{INT}}$: INTERRUPT
$\overline{\text{RES}}$: RESET
X1,X2: CLOCK OSC
TEST: TEST
PA3-0: INPUT PORT A
PB3-0: I/O PORT B
PC3-0: I/O PORT C
PD3-0: I/O PORT D
PE3-0: OUTPUT PORT E
PF3-0: OUTPUT PORT F
PG3-0: OUTPUT PORT G
PH3-0: OUTPUT PORT H

Figure 2—4 Block Diagram and Pin Assignment for µPD1512 and µPD1511

MICRO-COMPUTER	OSC(CLK) INPUT	OSC COMPONENTS	FREQUENCY
IC6201 INTERFACE	PINS ㉚ ㉛	X6201 C6201 C6202	12MHz
IC6001 SYSTEM CONTROL	PINS ㉒ ㉓	X6801 C6816 C6817	3.58MHz
IC2716 REEL SERVO	PINS ㉒ ㉓	X2701 C2738 C2739	3.58MHz
IC6902 KEY BOARD	PINS ㉒ ㉓	X6901 C6903 C6904	3.58MHz
IC2001 SERVO (1)	PINS ㉒ ㉓	X2001 C2005 C2006	3.58MHz
IC2002 SERVO (2)	PINS ㉒ ㉓	X2002 C2007 C2008	3.58MHz
IC2508 COLOUR FRAMING	PINS ㉒ ㉓	X2501 C2513 C2514	3.53MHz

Figure 2—5 Microcomputer Clock Circuit

2) Microcomputer Clock Circuit

The microcomputer clock is internally generated using the X'tal and capacitors at the oscillation input pins of each microcomputers as shown Figure 2—5.

3) Serial Data Transmision

In the multiple microcomputer system, serial data transfer is performed between each of the microcomputers.
There are three types of signal waveforms associated with serial data as shown in Figure 2—6.

A. Interrupt Request Signal

The Interrupt Request Signal is generated inside IC6201 on the interface C.B.A..
The Interrupt Request Signal is used to initiate the timing periods for serial transmissions.

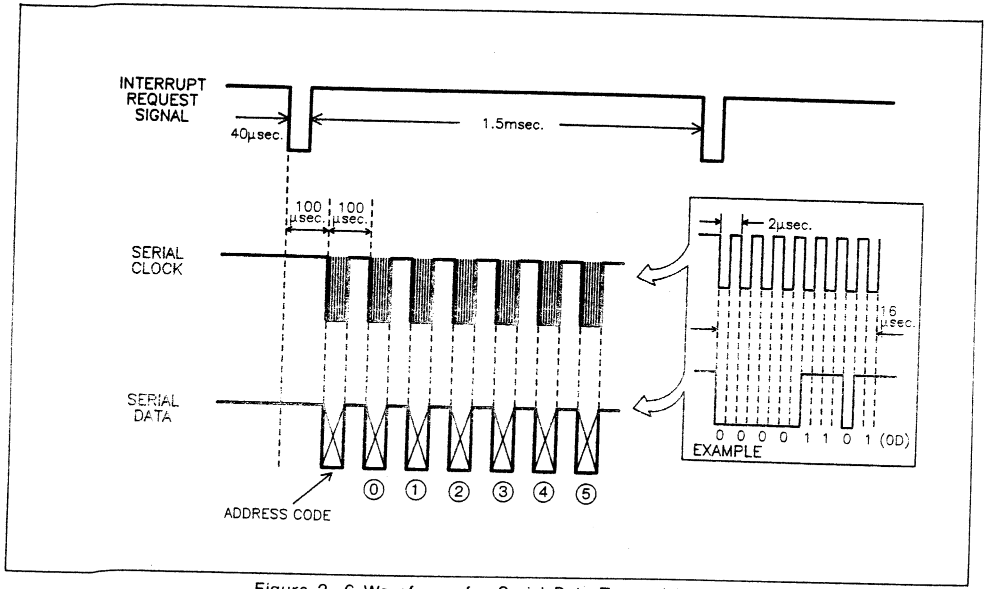

INTERRUPT REQUEST SIGNAL
40μsec.
1.5msec.
100 μsec.
100 μsec.
SERIAL CLOCK
SERIAL DATA
2μsec.
16 μsec.
0 0 0 0 1 1 0 1 (0D)
EXAMPLE
ADDRESS CODE
⓪ ① ② ③ ④ ⑤

Figure 2—6 Waveforms for Serial Data Transmision

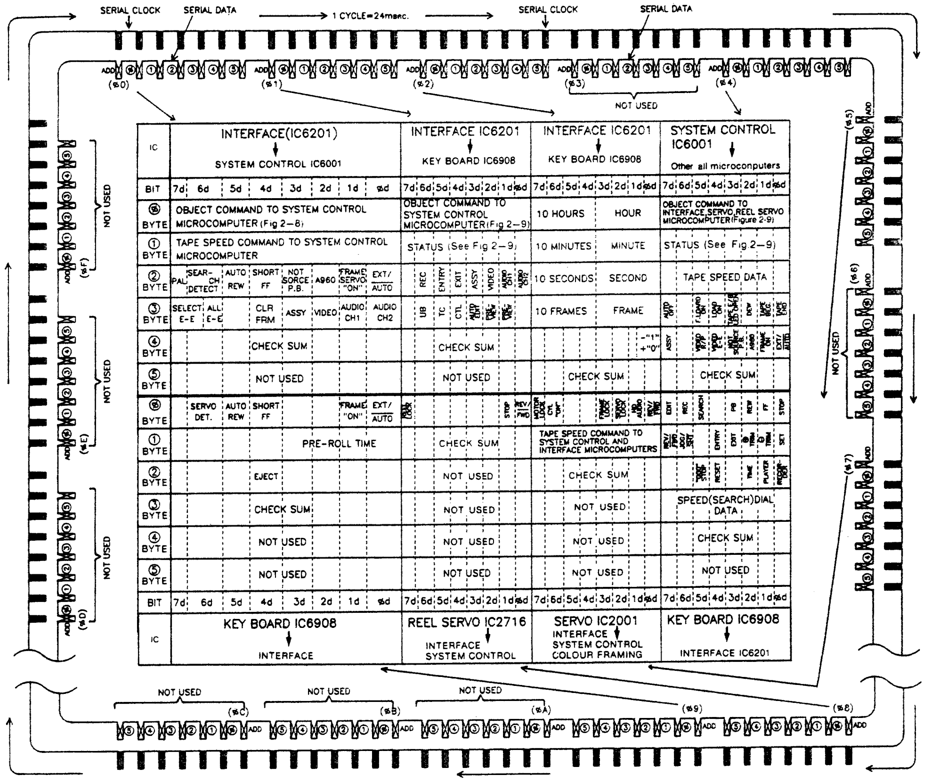

SERIAL CLOCK
SERIAL DATA
1 CYCLE=24msec.
ADD ⓪ ① ② ③ ④ ⑤
(ø0)
(ø1)
(ø2)
(ø3)
(ø4)
(ø5)
(ø6)
(ø7)
(ø8)
(ø9)
(øA)
(øB)
(øC)
(øD)
(øE)
(øF)
NOT USED
IC
INTERFACE(IC6201) → SYSTEM CONTROL IC6001
INTERFACE IC6201 → KEY BOARD IC6908
INTERFACE IC6201 → KEY BOARD IC6908
SYSTEM CONTROL IC6001 → Other all microconputers
BIT 7d 6d 5d 4d 3d 2d 1d ød
⓪ BYTE
① BYTE
② BYTE
③ BYTE
④ BYTE
⑤ BYTE
OBJECT COMMAND TO SYSTEM CONTROL MICROCOMPUTER (Fig 2—8)
TAPE SPEED COMMAND TO SYSTEM CONTROL MICROCOMPUTER
PAL
SEAR-CH DETECT
AUTO REW
SHORT FF
NOT SORCE P.B.
A960
FRAME SERVO "ON"
EXT/AUTO
SELECT E-E
ALL E-E
CLR FRM
ASSY
VIDEO
AUDIO CH1
AUDIO CH2
CHECK SUM
OBJECT COMMAND TO SYSTEM CONTROL MICROCOMPUTER(Fig 2—9)
STATUS (See Fig 2—9)
REC
ENTRY
EXIT
ASSY
VIDEO
AUDIO CH1
AUDIO CH2
UB
TC
CTL
AUTO EDIT
PRE-VIEW
PRE-VIEW
10 HOURS
HOUR
10 MINUTES
MINUTE
10 SECONDS
SECOND
10 FRAMES
FRAME
-"1"
+"0"
OBJECT COMMAND TO INTERFACE,SERVO,REEL SERVO MICROCOMPUTER(Figure 2-9)
STATUS (See Fig.2—9)
TAPE SPEED DATA
AUTO OFF
F.LOAD ON
LOAD ON
TAPE E/E LED OPEN
DEW
TAPE BEG.
TAPE END
ASSY
VIDEO R/P
VIDEO E/E
NOT SOURCE P.B.
A960
FRAME ON
EXT/AUTO
SERVO DET.
AUTO REW
SHORT FF
FRAME "ON"
EXT/AUTO
PRE-ROLL TIME
EJECT
REEL LOCK
STOP
REV/FWD
MOTOR LOCK
CTL "OFF"
FRAME LOCK
SERVO LOCK
HD AUDIO
REV/FWD
TAPE SPEED COMMAND TO SYSTEM CONTROL AND INTERFACE MICROCOMPUTERS
EDIT
REC
SEARCH
PB
REW
FF
STOP
REV/FWD
JOG/SET
ENTRY
EXIT
⊕ TRIM
⊖ TRIM
SET
TIME
RESET
TIME
PLAYER
RECOR-DER
SPEED(SEARCH)DIAL DATA
KEY BOARD IC6908 → INTERFACE
REEL SERVO IC2716 → INTERFACE SYSTEM CONTROL
SERVO IC2001 → INTERFACE SYSTEM CONTROL COLOUR FRAMING
KEY BOARD IC6908 → INTERFACE IC6201

Figure 2—7 Interface Maicrocomputer Cycled Address Software Chart

HEXA-DECIMAL CODE	BINARY CODE	OBJECT MODE
00	00000000	EJECT
05	00000101	REW
06	00000110	FF
0A	00001010	STOP
0F	00001111	STOP
33	00110011	EDIT REC/PLAY
34	00110100	PLAY
35	00110101	REC/PLAY
36	00110110	REC PAUSE
37	00110111	BACK SPACE
38	00111000	SEARCH FWD
39	00111001	
3A	00111010	
3B	00111011	SEARCH REC
3C	00111100	
3D	00111101	
3F	00111111	REC/PAUSE<2>(TAPE LOOSE)

Figure 2—8 The Object of Function Mode Software Chart

HEXA-DECIMAL CODE	BINARY	STATE CONDITION
00	00000000	EJECT MODE
01	00000001	POSITION<1>(MODE SELECT SW)
02	00000010	POSITION<3>(MODE SELECT SW)
03	00000011	NOT USED
04	00000100	POSITION<5>(MODE SELECT SW)
05	00000101	REW
06	00000110	FF
09	00001001	FF
0A	00001010	STOP
0F	00001111	STOP
10	00010000	DURING F.LOADING
11	00010001	DURING F.UNLOADING
12	00010010	POSITION<1>→ <3> (MODE SELECT SW)
13	00010011	POSITION<3>→ <5> (MODE SELECT SW)
14	00010100	BRAKE OFF FOR FF
15	00010101	BRAKE ON FOR FF
16	00010110	BRAKE OFF FOR REW
17	00010111	BRAKE ON FOR REW
18	00011000	DURING LOADING
19	00011001	DURING UNLOADING
20	00100000	P.ROLLER "ON" & BRAKE "OFF"
21	00100001	P.ROLLER "OFF" & BRAKE "ON"
22	00100010	CAPSTAN 0
23	00100011	CAPSTAN×1/25
2A	00101010	P.ROLLER "ON" & BRAKE "OFF"
2B	00101011	SELECT REC/P.B "OFF"
2C	00101100	FULL REC/P.B "OFF"
2D	00101101	CAPSTAN×1 REV
2E	00101110	CAPSTAN×1 FWD
2F	00101111	DELAY 1SEC
32	00110010	EDIT PLAY
33	00110011	EDIT REC/PLAY
34	00110100	PLAY
35	00110101	REC/PLAY
36	00110110	REC PAUSE
37	00110111	BACK SPACE
38	00111000	SEARCH FWD
39	00111001	
3A	00111010	
3B	00111011	SEARCH REV
3C	00111100	
3D	00111101	
3F	00111111	REC/PAUSE<2>(TAPE LOOSE)

Figure 2—9 The State of Function Condition Software Chart

B. Serial Clock

The serial Clock, which is generated inside IC6201 is necessary to synchronize the transmission and reception of the serial data between the six microcomputers.
In order to transmit much data on a single line, the Serial Clock is divided into 7 periods, (16usec), occurring every 1.5msec.

C. Serial Data

The Serial Data is transmitted to correspond with the serial clock timing.

The first period of the serial data is the address period.
In this period, the 8-bit address code is transmitted to all microcomputers from IC6201, the host microcomputer on the interface C.B.A., and according to this address code, required 8-bit data is output as data periods 0, 1, 2, 3, 4, and 5 from one of the seven microcomputers and transmitted to other microcomputers, For example, when address code 00000100(04) is output from the host microcomputer (IC6201) to all the microcomputers, 8-bit X 6-bit (0, 1, 2, 3, 4 and 5) data are transmitted from the system microcomputer (IC6001) to all the microcomputers.
The code charts are shown in Figures 2-7, 2-8 and 2-9 for reference, however it is impossible to make a survey of this serial data with an osilloscope because of the high speed of its change. Performance of the microcomputer can be judged as satisfactory if data pulses or the like are surveyed on an oscilloscope, as output of serial data.

D. Check Sum Code

In order to prevent mis operation of the microcomputer by externnal noise pick-up, etc, a check sum code is utilized. The serial data 0, 1, 2, 3, 4 and address code are added and converted to an 8 bit code. Then this 8 bit code is compared to the Check Sum Code. If the two do not correspond, the microcomputer rejects the serial data and waits for the next data.

4) Still/Pause Auto Release

If the still or pause mode continues for more than 5 to 8 minutes without interupting, the unit will be placed in the normal playback, tape loose or, X1/25 playback mode.
This protects both the tape and upper cylinder.

STILL/PAUSE	RELEASE TIMING	MODE
REC·PAUSE BY PAUSE/STILL KEY ON VTR	8 minutes	TAPE LOOSE AND CYLINDER STOP
STILL BY PAUSE/STILL KEY ON VTR	8 minutes	TAPE LOOSE AND CYLINDER STOP
STILL BY SEARCH DIAL ON VTR	8 minutes	X 1/25 PLAY
REC·PAUSE BY PAUSE/STILL KEY ON AG-A650	8 minutes	TAPE LOOSE AND CYLINDER STOP
STILL BY PAUSE/STILL KEY ON AG-A650	8 minutes	X 1/25 PLAY
STILL BY SEARCH DIAL ON AG-A650	8 minutes	X 1/25 PLAY
REC·PAUSE BY PAUSE/STILL KEY ON NV-A500	5 minutes	X 1/25 PLAY
STILL BY PAUSE/STILL KEY ON NV-A500	5 minutes	X 1/25 PLAY
STILL BY SEARCH DIAL ON NV-A500	5 minutes	X 1/25 PLAY

Figure 2—10 Still/Pause Auto Release

INDICATION	DEFECT	RELATED C.B.A. OR PARTS
E 1	TAPE END/BEG DETECTION LED OPEN	SYSTEM CONTROL, MECHANICAL SECTION
E 2	FRONT LOADING MOTOR LOCK (UNLOADING)	SYSTEM CONTROL, FRONT LOADING MECHANICAL SECTION
E 3	LOADING MOTOR LOCK (6 sec.)	SYSTEM CONTROL, MECHANICAL SECTION
E 4	CYLINDER MOTOR LOCK (6 sec.)	CYLINDER MOTOR, SERVO C.B.A.
E 5	REEL MOTOR LOCK / CAPSTAN LOCK (2~6sec.)	REEL SERVO C.B.A. CAPSTAN (SERVO C.B.A.)
E 6	ABNORMAL TAPE TENSION (3 sec.)	REEL SERVO C.B.A., MECHANICAL SECTION

Figure 2—11 Defect Indication Table

5) Defect Indication

If the following defect or abnormal condition occures, it will be indicated by the letters "E1, E2 and etc. ON the tape counter display. If one of the following indication appears, check the related section.

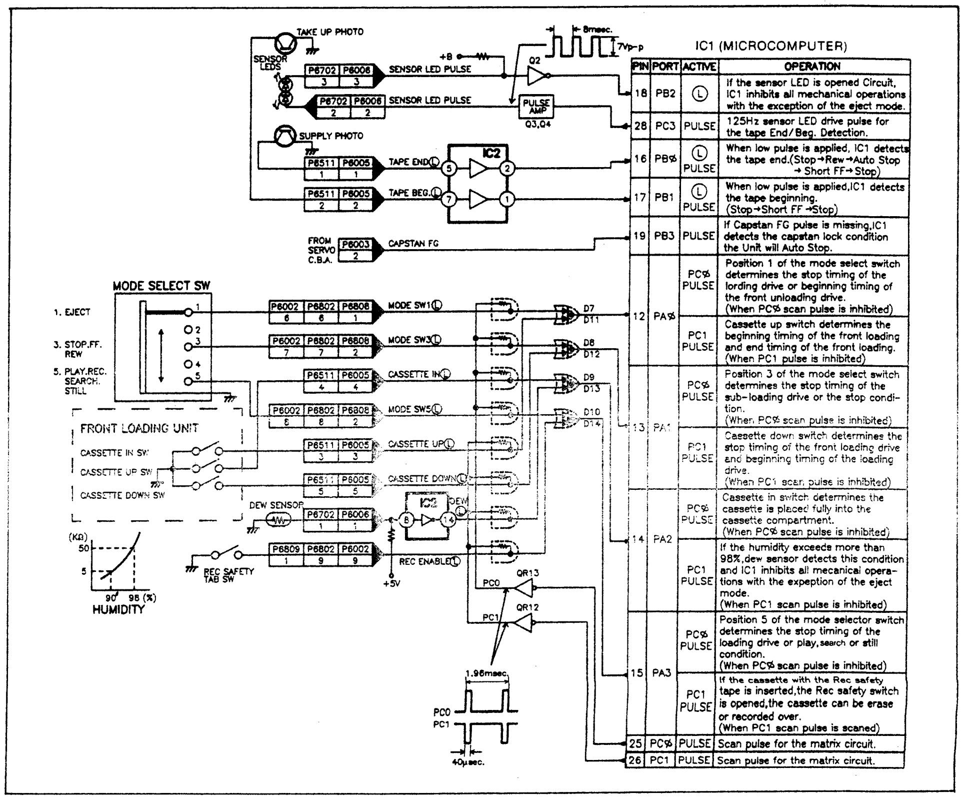
2—2. System Control Circuit (1)

General Description

The System Control (microcomputer) circuit provides all the recognition of inputs from the safety devices, internal transport status and front loading mechanism status. It generates the output signals for video and audio control, electronic system control and edit sequence timing control.

1) Safety Device

The microcomputer IC1 monitors the safety devices of the unit in order to detect conditions that might cause damage to the tape or machine.
IC1 places the unit into the Stop mode, whenever a safety device operates.
A safety devices block diagram and function are shown in Figure 2—12.

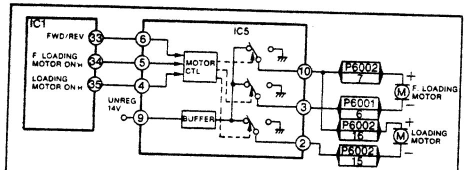


PIN	PORT	ACTIVE	OPERATION
18	PB2	Ⓛ	If the sensor LED is opened Circuit, IC1 inhibits all mechanical operations with the exception of the eject mode.
28	PC3	PULSE	125Hz sensor LED drive pulse for the tape End/Beg. Detection.
16	PB0	Ⓛ PULSE	When low pulse is applied, IC1 detects the tape end.(Stop→Rew→Auto Stop → Short FF→Stop)
17	PB1	Ⓛ PULSE	When low pulse is applied,IC1 detects the tape beginning. (Stop→Short FF →Stop)
19	PB3	PULSE	If Capstan FG pulse is missing,IC1 detects the capstan lock condition the Unit will Auto Stop.
12	PA0	PC0 PULSE	Position 1 of the mode select switch determines the stop timing of the lording drive or beginning timing of the front unloading drive. (When PC0 scan pulse is inhibited)
		PC1 PULSE	Cassette up switch determines the beginning timing of the front loading and end timing of the front loading. (When PC1 pulse is inhibited)
13	PA1	PC0 PULSE	Position 3 of the mode select switch determines the stop timing of the sub-loading drive or the stop condition. (When PC0 scan pulse is inhibited)
		PC1 PULSE	Cassette down switch determines the stop timing of the front loading drive and beginning timing of the loading drive. (When PC1 scan pulse is inhibited)
14	PA2	PC0 PULSE	Cassette in switch determines the cassette is placed fully into the cassette compartment. (When PC0 scan pulse is inhibited)
		PC1 PULSE	If the humidity exceeds more than 98%,dew sensor detects this condition and IC1 inhibits all mecanical operations with the expeption of the eject mode. (When PC1 scan pulse is inhibited)
15	PA3	PC0 PULSE	Position 5 of the mode selector switch determines the stop timing of the loading drive or play,search or still condition. (When PC0 scan pulse is inhibited)
		PC1 PULSE	If the cassette with the Rec safety tape is inserted,the Rec safety switch is opened,the cassette can be erase or recorded over. (When PC1 scan pulse is scaned)
25	PC0	PULSE	Scan pulse for the matrix circuit.
26	PC1	PULSE	Scan pulse for the matrix circuit.

Figure 2—12 Safety Devices Circuit

2) Loading and Front Loading Motors Drive Circuit.

The loading motor drives the sub-loading post loading posts, tension arm and so on.
by means of a Cam Gear movement, in accordance with the mode select switch.
Timing of the motor drive signal is snown in Figure 2-13.
The loading motor is controlled by the mechanical status signals coming from the mode select switch.
The Front Loading motor is controlled by the cassettes switches SW1 and SW2 (See Figure 2-12).



LOADING/F LOADING MOTOR DRIVE SIGNAL

MOTOR		F LOADING			LOADING MOTOR		
DIRECTION		DOWNWARD	UPWARD	BRAKE	LOADING	UNLOADING	BRAKE
IN	IC5-4	L	L	H	H	H	L
	IC5-5	H	H	H	L	L	L
	IC5-6	L	H		L	H	
OUT	IC5-10	H	L	L	H	L	L
	IC5-2	OPEN	OPEN	L	L	H	L
	IC5-3	L	H	L	OPEN	OPEN	L

Figure 2-13 Front Loading/Loading Motor Drive

3) Mode Select Switch

Mechanical modes of the tape transport mechanism are derived from the rotation of the loading motor.
The loading motor is controlled by outputs from the system control microcomputer in response to operational input commands.
Rotation of the loading motor drives the cam gear.
The cam gear drives the loading post and Main Rod.
This Main Rod is connected to the mode select switch which works as an interface between the mechanical parts and the electrical circuitry (See Figure 2-12).
The moving contact is operated by the main rod.
As one side of the moving contact is connected to GND, a signal which depends on the mechanical position is generated.
The mode select switch constantly monitors the mechanical position and sends that data back to the system control microcomputer.
In this way the microcomputer can monitor the exact mechanical position at any instant and can stop the loading motors movement when the reaching to the required position.

4) Solenoid Drive Circuit

The Supply Solenoid, Takeup Solenoid and Pressure Solenoid have been incorporated in this model. This provides more precise tape transport control.
The solenoids are operate as shown in Figure 2-14.

SOLENOID / MODE	SUPPLY SOLENOID	TAKEUP SOLENOID	PRESSURE ROLLER SOLENOID
PURPOSE	To release the Supply Brake.	To release the Takeup Brake.	To hold the tape in tightly against the capstan shaft.
STOP	OFF	OFF	OFF
SUB-LOADING LOADING	ON	OFF	OFF
SUB-UNLOADING UNLOADING	ON	OFF	OFF
FF	ON	ON	OFF
REW	ON	ON	OFF
PLAYBACK(×1) REC/PLAY	ON	ON	ON
JOG SHUTTLE	ON	ON	ON

Figure 2-14 Supply Solenoid. Takeup Solenoid and Pressure Solenoid

This description will apply to all the solenoids Pressure Solenoid, Supply Solenoid and Takeup Solenoid.
although, Figure 2-15 will be shown only for the Pressure Solenoide.
The control program causes pin 29 of IC1 to go low when the pressure roller solenoid should be energized. This turns Q6 ON.
Since more current is required for pull-in that for solenoid hold, Q7 is turned ON, Q7 turns Q8 OFF so that switching transistor inside IC3 is turned ON by the charging current of C9.
Q6 also turns Q5 ON and switching transistor inside IC4, remain ON.

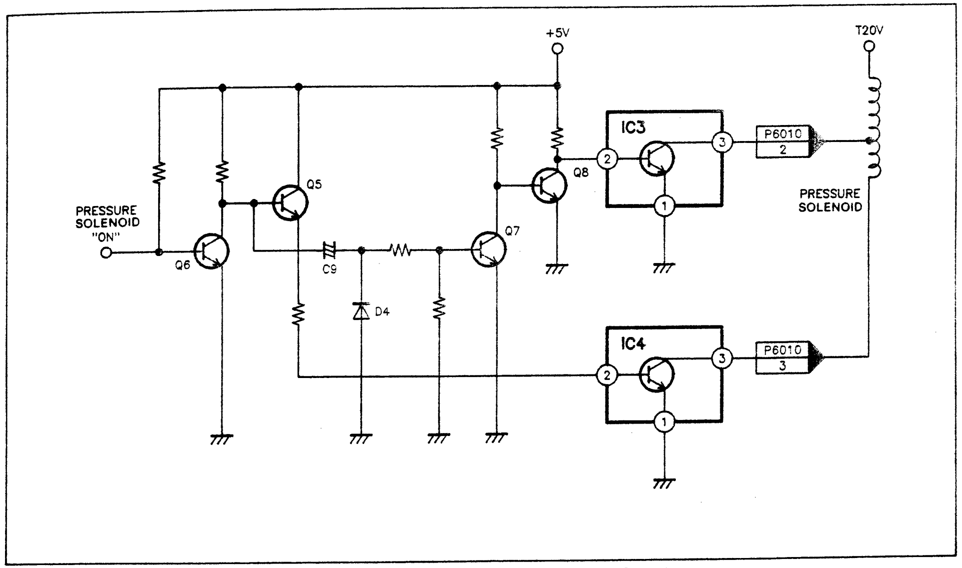


Figure 2-15 Pressure Solenoid Drive Circuit

5) Other Controls

The microcomputer IC1 controls the video, audio and other circuits in accordance with the selected mode.
The control outputs from the system control microcomputer are shown in Figure 2-16.

PIN	FUNCTION	ACTIVE	SUPPLIED TO
1	AUDIO CH2 E-E	H	NORMAL AUDIO
2	AUDIO CH2 REC/PLAY	L	NORMAL AUDIO
3	AUDIO CH2 ERASE	L	NORMAL AUDIO
4	EDIT "ON"	H	———
5	AUDIO CH1 E-E	H	NORMAL AUDIO
6	AUDIO CH1 REC/PLAY	L	NORMAL AUDIO
7	AUDIO CH1 ERASE	L	NORMAL AUDIO
8	TAPE END	L	REEL SERVO
40	FULL ERASE "ON"	L	NORMAL AUDIO
39	FLYING ERASE"ON"	L	SUB-SYSTEM CNTL
38	VIDEO/HD AUDIO REC/PLAY	L	SUB-SYSTEM CNTL
37	VIDEO/HD AUDIO E-E	H	SUB-SYSTEM CNTL

Figure 2-16 Other Control Signals

6) Pop Noise Elimination Circuit

In the normal audio circuit of CH1 and CH2 during "Insert Recording" during switch over from "E-E" to "V-V" mode and as the Audio Mute function is activated, pop noise must be eliminated.
Now, as the "Guard" gap between the audio Heads for CH1 and CH2 (0.3mm) is very narrow, e.g. during "Insert Edit" mode at CH2 only and while playing back at CH1, upon switching from "E-E" to "V-V" mode, the Audio Head for CH1 will pick up the audio bias switching, leading to the generation of the "Pop" noise. Upon carrying out Insert Editing on CH1, similar noise would be generated on CH2.
The Mute timing is as shown in Figure 2-17 for CH1. During Audio Insert Recording mode, at the point of switching over from "E-E" to "V-V", CH2 will suffer muting for a period of 75 msec; after which CH1 will suffer muting for 500 msec and thereby Pop noise is eliminated.

In the modes started hereunder, muting would be carried out in the following manner.

a. In modes other than "Insert Editing", as the anodes of D40 and D41 go low thus muting cannot be carried out.
b. During audio insert mode for both CH1 and CH2, when D16 and D18 are activated, all outputs from Pins 2 and 8 of IC11 will be inhibited, and thus 500 msec muting pulse would be activated at Pins 2 and 8 of IC14 only.

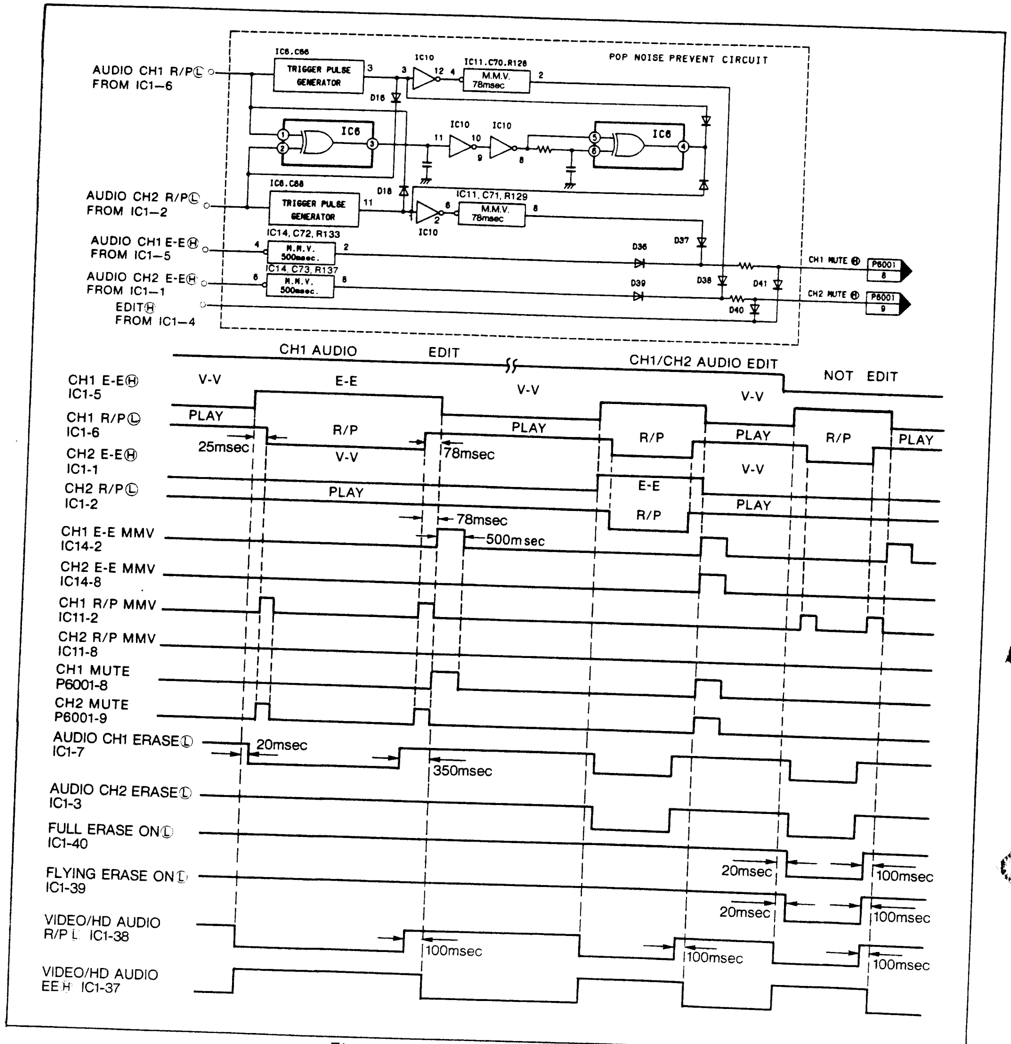

POP NOISE PREVENT CIRCUIT
AUDIO CH1 R/PⓁ FROM IC1–6
AUDIO CH2 R/PⓁ FROM IC1–2
AUDIO CH1 E-EⒽ FROM IC1–5
AUDIO CH2 E-EⒽ FROM IC1–1
EDITⒽ FROM IC1–4
TRIGGER PULSE GENERATOR
M.M.V. 78msec
M.M.V. 500msec
CH1 MUTE Ⓗ P6001 8
CH2 MUTE Ⓗ P6001 9
CH1 AUDIO
EDIT
CH1/CH2 AUDIO EDIT
NOT EDIT
CH1 E-EⒽ IC1-5
CH1 R/PⓁ IC1-6
CH2 E-EⒽ IC1-1
CH2 R/PⓁ IC1-2
CH1 E-E MMV IC14-2
CH2 E-E MMV IC14-8
CH1 R/P MMV IC11-2
CH2 R/P MMV IC11-8
CH1 MUTE P6001-8
CH2 MUTE P6001-9
AUDIO CH1 ERASEⓁ IC1-7
AUDIO CH2 ERASEⓁ IC1-3
FULL ERASE ONⓁ IC1-40
FLYING ERASE ONⓁ IC1-39
VIDEO/HD AUDIO R/P L IC1-38
VIDEO/HD AUDIO EE H IC1-37
V-V
E-E
PLAY
R/P
25msec
78msec
500msec
20msec
350msec
100msec

Figure 2–17 Pop Noise Elimination Circuit

2–3 System Control Circuit (2)

General Description

HD/Audio/Video Record and Flying Erase Timing

In order to properly join new HD audio/Video to previously recorded signals, the turn–on and turn–off point for both the video, HD audio and the high frequency flying erase heads must be precisely controlled. The flying erase heads eradicate the previous recording, allowing a space for the new signal to be written. This occurs for video insert editing and for a short time during ASSY recording.
Figure shows the angular position of the eight heads on the head cylinder and distance (timing) relation between the flying erase heads, HD audio heads and Video heads.
As shown in Figure 2–18 the flying erase heads are separated by +120degrees (13.33msec.) from the main video heads and the HD audio heads are separated by +60degrees (6.66msec.) from the main heads.

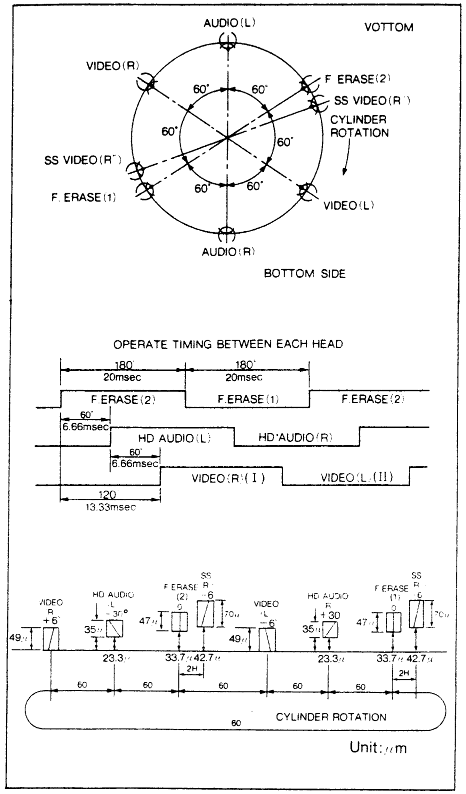

AUDIO(L)
VOTTOM
VIDEO(R)
F. ERASE(2)
SS VIDEO(R')
CYLINDER ROTATION
60°
SS VIDEO(R'')
F. ERASE(1)
VIDEO(L)
AUDIO(R)
BOTTOM SIDE
OPERATE TIMING BETWEEN EACH HEAD
180° 20msec
F.ERASE(2)
F.ERASE(1)
6.66msec
HD AUDIO(L)
HD AUDIO(R)
VIDEO(R)(I)
VIDEO(L)(II)
120 13.33msec
VIDEO
HD AUDIO
F.ERASE
SS
23.3
33.7
42.7
2H
CYLINDER ROTATION
Unit: μm

Figure 2–18 Upper Cylinder and Timing Relation, Between Each Heads

As may be obvious, the erase heads and HD audio heads must not only be offset by +120degrees and +60degrees around the circumference of the head drum, but they are offset in height from the position of the video heads as shown in Figure 2–18.
This allows the erase heads and HD audio heads to arrive in the exact spot the video head will strike, When it arrives on the tape, and so on up the entire video track.
However, this vertical displacement causes the flying erase head to erase over the Audio Tracks. Therefore, each flying erase head is driven independently, and each is turned off for 5.1 milliseconds, or 80 Horizontal lines (H), at the end of their sweep up the tape (See Figure 2–19).

This will be called the Virtual Head Switching Signal, or the Virtual Head Switching Point. This is the point where actual head switching will take place during playback.
Recall that since the tape wraps around the cylinder for more than 180 degrees, there is a Virtual Head Switching point at both the beginning and ending sections of any track.
Figure 2–19 shows that the erase head turn off is timed to occur at the Virtual Head Switching point. It must turn off so as not to erase the audio tracks remaining for 5.1 msec (80H) prior to leaving the tape.
This action, called Audio Jumping, takes place for both erase heads and for EVERY head sweep across the tape during Video Insert recording (and for 2 seconds after the start of Assembly recording). As long as the flying erase function is ON, the erase heads will jump the audio tracks, and then turn on again after they have safely left the tape, and are ready to erase the next track.

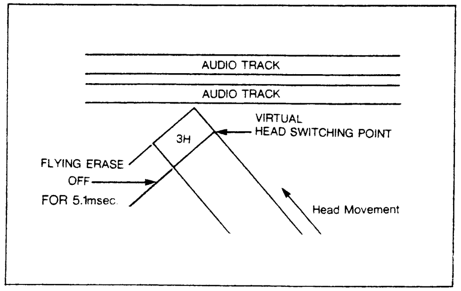

AUDIO TRACK
AUDIO TRACK
3H
VIRTUAL HEAD SWITCHING POINT
FLYING ERASE OFF FOR 5.1msec
Head Movement

Figure 2–19 Shows that the video/HD audio tiack

At the start of a Video insert (CUT IN) or ASSY, care must be taken that no blank spots exist in the video recording. To insure continuous signal, the video record signal is turned on after the vertical sync of the previous recording but prior to active picture scan. It is timed to be 8 horizontal lines (H) from the virtual head switching point. Flying Erase is turned on 13 H after virtual head switching, which is still within picture vertical blanking as shown Figure 2–20.
Therefore, there is a 5H section at the beginning of the track which is double recorded.

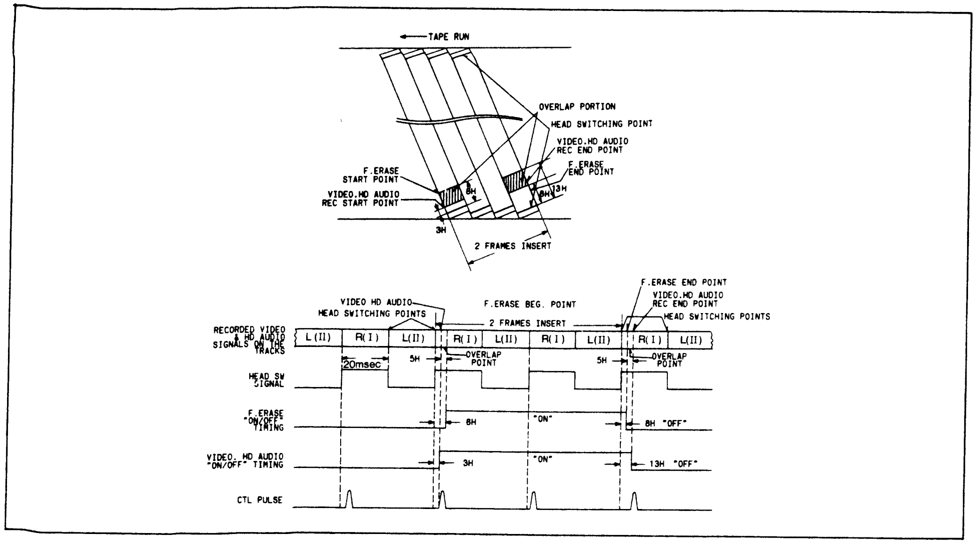

TAPE RUN
OVERLAP PORTION
HEAD SWITCHING POINT
VIDEO.HD AUDIO REC END POINT
F.ERASE END POINT
F.ERASE START POINT
VIDEO.HD AUDIO REC START POINT
8H
8H
13H
3H
2 FRAMES INSERT
F.ERASE END POINT
VIDEO.HD AUDIO REC END POINT
VIDEO HD AUDIO
HEAD SWITCHING POINTS
F.ERASE BEG. POINT
2 FRAMES INSERT
HEAD SWITCHING POINTS
RECORDED VIDEO & HD AUDIO SIGNALS ON THE TRACKS
L(II)
R(I)
L(II)
R(I)
L(II)
R(I)
L(II)
R(I)
L(II)
20msec
5H
OVERLAP POINT
5H
OVERLAP POINT
HEAD SW SIGNAL
F.ERASE "ON/OFF" TIMING
8H
"ON"
8H "OFF"
VIDEO. HD AUDIO "ON/OFF" TIMING
3H
"ON"
13H "OFF"
CTL PULSE

Figure 2–20 Erase/HD Audio/Video ON/OFF Timing

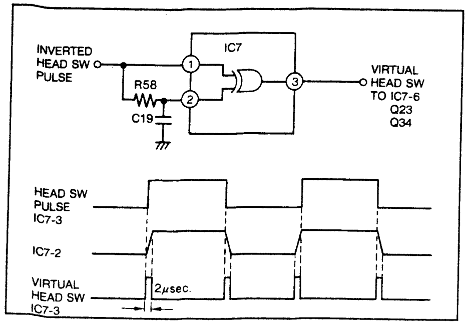

INVERTED HEAD SW PULSE
IC7
①
②
③
R58
C19
VIRTUAL HEAD SW TO IC7-6 Q23 Q34
HEAD SW PULSE IC7-3
IC7-2
VIRTUAL HEAD SW IC7-3
2μsec.

Figure 2–21 Virtual Head Switching

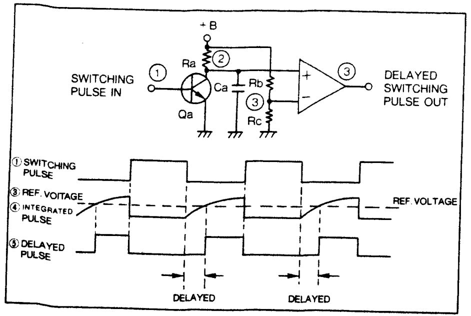

+B
Ra
②
Rb
③
Rc
Ca
Qa
①
③
SWITCHING PULSE IN
DELAYED SWITCHING PULSE OUT
① SWITCHING PULSE
② REF. VOLTAGE
④ INTEGRATED PULSE
③ DELAYED PULSE
REF. VOLTAGE
DELAYED
DELAYED

Figure 2–22 Delay Circuit

For the end of a Video insert (CUT OUT), the Video Record/HD Audio and Flying Erase must turn OFF in a fashion that assures no lack of video and HD audio. This is accomplished by turning OFF the flying erase head 8H from virtual head switching and the video record 13H from virtual head switching, both within vertical blanking (See Figure 2–20). The virtual head switching point used here as CUT OUT, is the very next one produced after CUT OUT is pressed. And, again, there is a 5H section of the track where there is double recording.

1) Virtual Head Switching Pulse Circuit

The head switching pulse from the servo circuit which defines in time when video heads L and R are on the tape and active is a 50% duty cycle squarewave, since the following circuits must be triggered for both heads, the signal is applied to integrate circuit (R125 and C68) and exclusive OR gate so that 2usec trigger pulse at each head switching transition is generated at pin 3 of IC7 as shown in Figure 2–21.

2) Delay Circuit

The following five delay circuits are used to produce Switching Signals at an exact spot in HD audio/video recording.

(a) Flying Erase 8H Delay Circuit (Set pulse)
(b) HD Audio 3H Delay Circuit (Set pulse)
(c) HD Audio 13H Delay Circuit (Reset pulse)
(d) Video 3H Delay Circuit (Set pulse)
(e) Video 13H Delay Circuit (Reset pulse)

These circuits are delayed by the configuration of transistor, capacitor, resistor, and differential amplifiers, as shown in Figure 2–22.

The inverted switching pulse is charged by Ca. Output of the differential amplifier becomes High when the voltage of − + ICa and input of the differential amplifier gradually rise to reach the threshold level. By repeating this operation, delay can be made as shown in the timing chart in Figure 2–22.
This delay period is regulated by the reference voltage of the differential amplifier and the time constant of Ca and Ra.

3) Flying Erase Delay Circuit

Flying Erase Delay Circuit
In order to turn ON and OFF the flying erase at the beginning and end of the track, a pulse must be made +120 degrees (−60 degrees) offset from head switching pulse.
In addition, it is desired for the flying erase head remain OFF for a small amount of time (8H) past the point which is +120 degrees offset from the video head switching.
The inverted virtual head switching pulse is applied to pin 4 of IC9 (M.M.V.) and the virtual head switching pulse is shifted by −60 degrees (6.66 msec.).
The virtual head switching pulse is inverted by IC7 and fed to pin4 of IC9. Then, it is shifted into −60 degrees (6.66 msec.) by M.M.V. that consists of IC9, C20, R64, and VR3. This shifted pulse is inverted by Q16 to make its frequency 25 Hz while the output frequency of Q16 is 50 Hz, which is made by QR15 being on while the head switching pulse is high. This shifted pulse of 25Hz, 6.66msec. is integratd by C21 and delayed for 8 H by the reference voltage of IC6. Then, the 25Hz pulse is delayed for 6.66msec. (60 degrees) and 8 H is given by the falling edge of the head switching pulse, as for Pin1 of IC12. This pulse is applied to the flying erase hold circuit to start or stop flying erase with this timing.

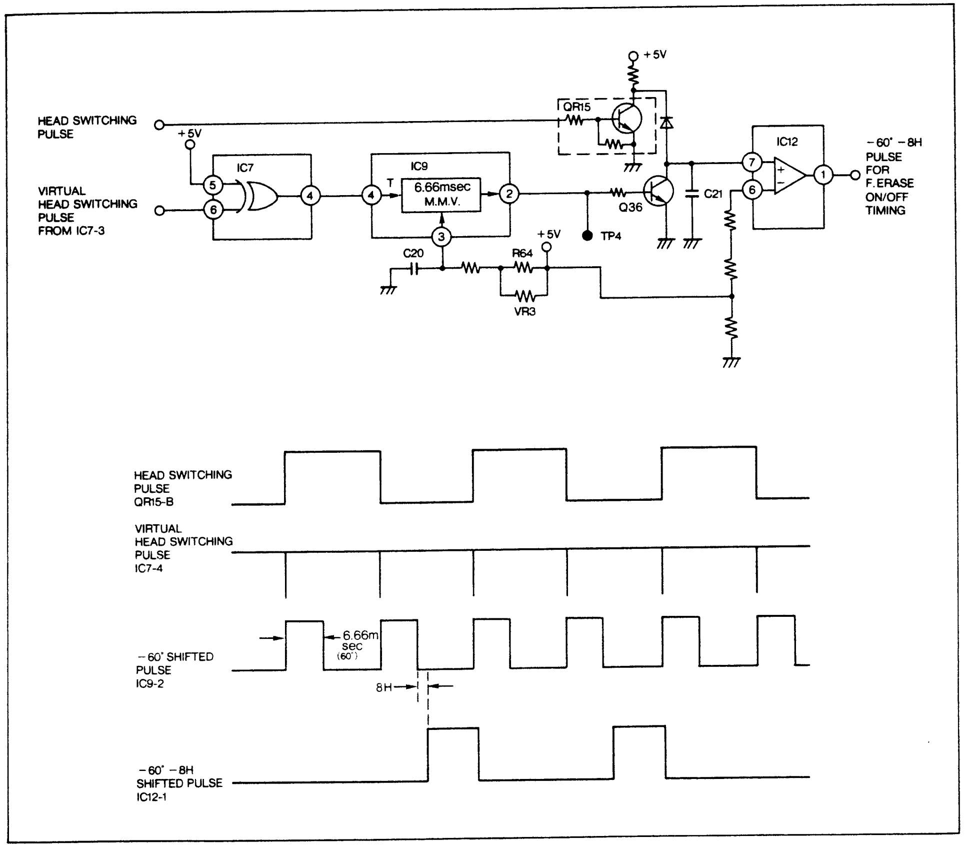

+5V
QR15
HEAD SWITCHING PULSE
+5V
IC7
⑤
⑥
④
VIRTUAL HEAD SWITCHING PULSE FROM IC7-3
IC9
T
6.66msec M.M.V.
④
②
③
C20
R64
+5V
VR3
TP4
Q36
C21
IC12
⑦
⑥
①
−60° −8H PULSE FOR F.ERASE ON/OFF TIMING
HEAD SWITCHING PULSE QR15-B
VIRTUAL HEAD SWITCHING PULSE IC7-4
−60° SHIFTED PULSE IC9-2
6.66m sec (60°)
8H
−60° −8H SHIFTED PULSE IC12-1

Figure 2–23 Flying Erase Delay Circuit

4) Flying Erase Latch Circuit

The set pulse (−60degrees and−8H) from pin1 of IC12 is applied to pin 3 of IC15 which is the clock input of D−type flip−flop, and the data input signal is the microcomputer flying erase "ON" low output so that high signal appears at pin 2 of IC15 and low signal appears at pin 1 of IC15 which is the starting point of the Flying Erase.
Conside the Flying Erase ending point inorder to prevent a noise gap.
When Flying Erase "ON" low output goes high, high appears at pin 2 of IC15 and low appears at pin 1 of IC15. Which is the ending point of the Flying Erase.
The Flying Erase "ON" low at pin 1 of IC15 enables the HD audio and Video recording which serves as set input of IC21−6 (HD audio latch) and IC13−6 (Video latch) (See Figure 2−24).

5) HD Audio Recording ON/OFF Timing Circuit

In order to turn ON/OFF the HD audio at the beginning and end of the track, a pulse must be made + 60 degrees (−120 degrees) offset from video head switching in addition, it is desired for the HD audio head to remain on for a small amount of time (3H) and OFF for 13H.

The virtual head switching pulse which is inverted by IC17−6 and 4 is applied to pin 6 of IC9 (M.M.V) and the virtual head switching pulse is shifted by −120 degrees (13.33 msec).

The shifted pulse from pin 8 of IC9 triggers a 3H delay circuit.
If the flying erase "ON" command from pin 1 of IC15 is low that appears at set input of IC21−6 and the Rec/Play command from pin 38 of IC1 is low that appears at data input of IC21−5 and 9. After the HD audio recording latch circuit is triggered by the 3H delayed pulse from pin 1 of IC20, it returns Q at pin 2 of IC21 high and this turns Q at pin 12 high. This will keep ON HD audio recording until the clock input at pin 8 goes high (HD audio reset). (See Figure 2−25)

6) HD Audio/Video Latch Reset Circuit

Consider the HD audio and video recording ending point in order to prevent a noise gap.
AND gates 1 (D28 and D29) and 2 are opened when the flying erase latch circuit (IC15) is reset and pin 1 of IC15 is set to high from low.
Hence, the shifted pulse of −120 degrees is delayed for 13H by the delay circuit consisting of C42 and IC20 after it is passed through NAND gate 2 (R113), Pin 12 of IC21 is turned Low from High by the rising edge of this shifted pulse. This Low pulse is fed to the HD audio circuit as well as to D28 simultaneously, and AND gate 4 is closed.
Then, no more reset pulses are fed to Pin 5 of
Almost the same circuit is used for the video recording reset circuit as the above.
(See Figure 2−25).

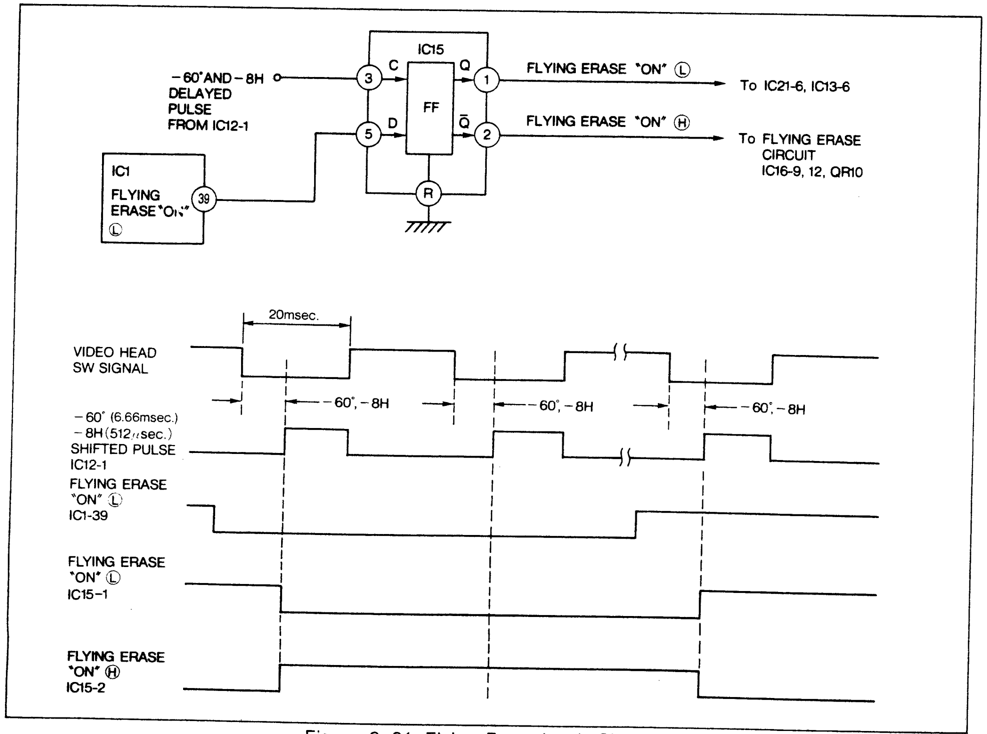

IC15
C
Q
FF
D
Q̄
R
3
1
5
2
−60°AND−8H DELAYED PULSE FROM IC12-1
FLYING ERASE "ON" Ⓛ
To IC21-6, IC13-6
FLYING ERASE "ON" Ⓗ
To FLYING ERASE CIRCUIT IC16-9, 12, QR10
IC1 FLYING ERASE "ON" Ⓛ
39
20msec.
VIDEO HEAD SW SIGNAL
−60°, −8H
−60°, −8H
−60°, −8H
−60° (6.66msec.)
−8H (512μsec.)
SHIFTED PULSE IC12-1
FLYING ERASE "ON" Ⓛ IC1-39
FLYING ERASE "ON" Ⓛ IC15−1
FLYING ERASE "ON" Ⓗ IC15-2

Figure 2−24 Flying Erase Latch Circuit

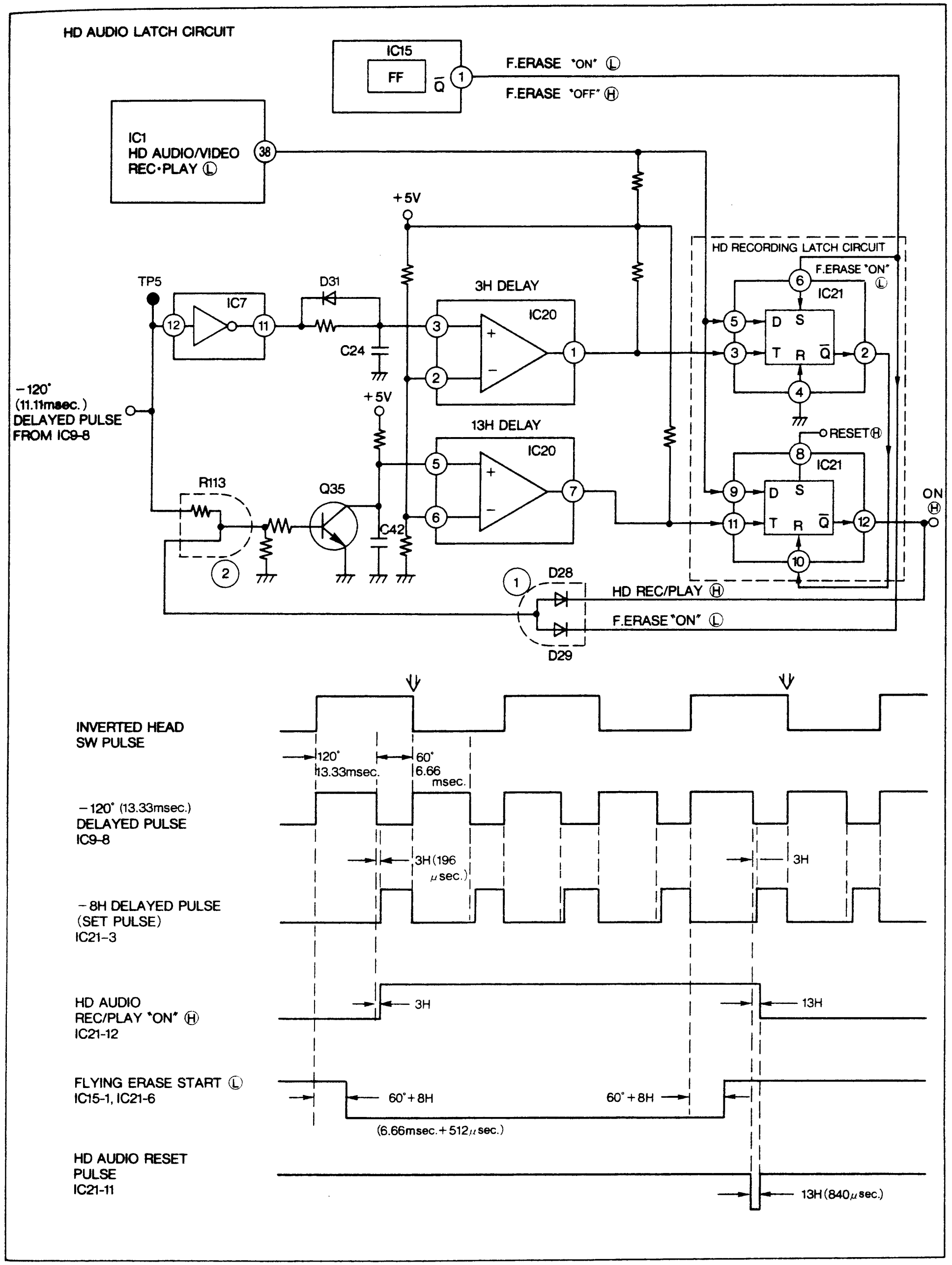

HD AUDIO LATCH CIRCUIT
IC15
FF
Q̄
1
F.ERASE "ON" Ⓛ
F.ERASE "OFF" Ⓗ
IC1 HD AUDIO/VIDEO REC·PLAY Ⓛ
38
+5V
HD RECORDING LATCH CIRCUIT
F.ERASE "ON" Ⓛ
TP5
IC7
12
11
D31
C24
3H DELAY
IC20
3
2
1
+5V
13H DELAY
IC20
5
6
7
R113
Q35
C42
2
1
D28
D29
HD REC/PLAY Ⓗ
F.ERASE "ON" Ⓛ
−120° (11.11msec.) DELAYED PULSE FROM IC9-8
IC21
6
5
3
D S
T R Q̄
2
4
RESET Ⓗ
IC21
8
9
11
D S
T R Q̄
12
10
ON Ⓗ
INVERTED HEAD SW PULSE
120° 13.33msec.
60° 6.66 msec.
−120° (13.33msec.) DELAYED PULSE IC9-8
3H (196 μsec.)
3H
−8H DELAYED PULSE (SET PULSE) IC21-3
HD AUDIO REC/PLAY "ON" Ⓗ IC21-12
3H
13H
FLYING ERASE START Ⓛ IC15-1, IC21-6
60°+8H
60°+8H
(6.66msec.+512μsec.)
HD AUDIO RESET PULSE IC21-11
13H (840μsec.)

Figure 2−25 HD Audio Latch Circuit

8) Video Recording ON/OFF Timing Circuit

The video recording ON/OFF timing circuit is similar to as the HD audio recording ON/OFF circuit.
As for recording ON/OFF timing of the video head, virtual head switching is used since the head switching signal is not 60 degrees ahead in the same phase like the HD head.
The circuit operation is almost the same as in the HD audio ON/OFF timing circuit as shown in Figure 2–26.

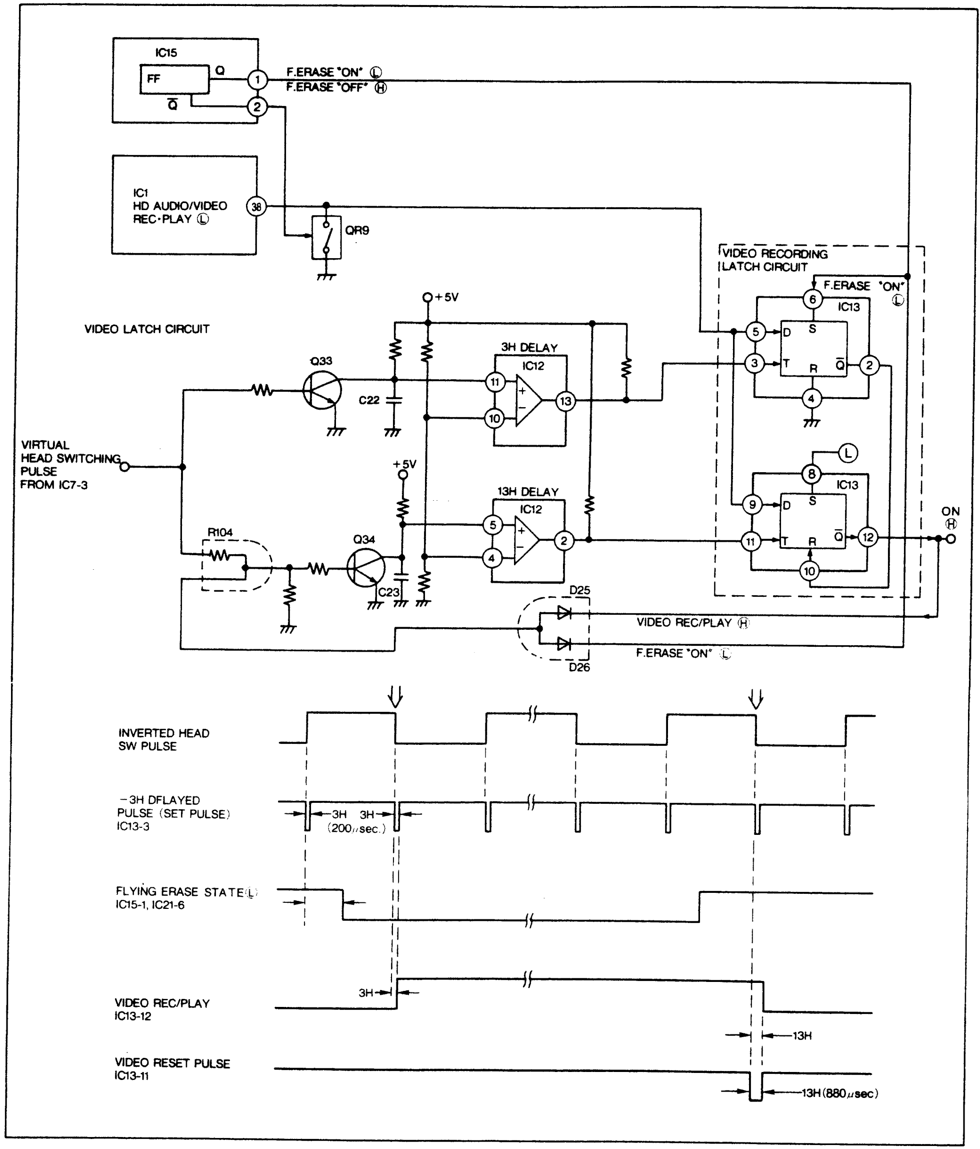

IC15
FF
Q
Q̄
F.ERASE "ON" Ⓛ
F.ERASE "OFF" Ⓗ
IC1
HD AUDIO/VIDEO
REC·PLAY Ⓛ
38
QR9
VIDEO RECORDING
LATCH CIRCUIT
F.ERASE "ON" Ⓛ
IC13
+5V
VIDEO LATCH CIRCUIT
Q33
C22
3H DELAY
IC12
VIRTUAL
HEAD SWITCHING
PULSE
FROM IC7-3
R104
Q34
C23
13H DELAY
IC12
ON
Ⓗ
D25
D26
VIDEO REC/PLAY Ⓗ
F.ERASE "ON" Ⓛ
INVERTED HEAD
SW PULSE
−3H DFLAYED
PULSE (SET PULSE)
IC13-3
3H 3H
(200μsec.)
FLYING ERASE STATE Ⓛ
IC15-1, IC21-6
VIDEO REC/PLAY
IC13-12
3H
13H
VIDEO RESET PULSE
IC13-11
13H (880μsec)

Figure 2–26 Video ratch Circuit

9) Normal Audio Track Jump Circuit

As was briefly mentioned, the flying erase heads cross the audio track, and would erase it if the heads were not gated.
IC7, D43 and C18 are delay circuit, triggered by the −60 degrees pulse which signifies the beginning and end of the track for flying erase. This 5.1 msec. pulse begins at the space headswitching point and continues until the audio track is safely passed (See Figure 2–19). Since the other flying erase head is in the active video region at this point, each head must be gated ON and OFF individually. This requires both normal headswitching and the 5.1 msec. pulse.

The output of IC15 (pin 2), the flying erase on hold circuit (FF) also gates the output of IC16 as shown Figure 2–28.

The 5.1 msec normal audio track jump pulse is applied to Pins 5 and 2 of IC16, the negative head

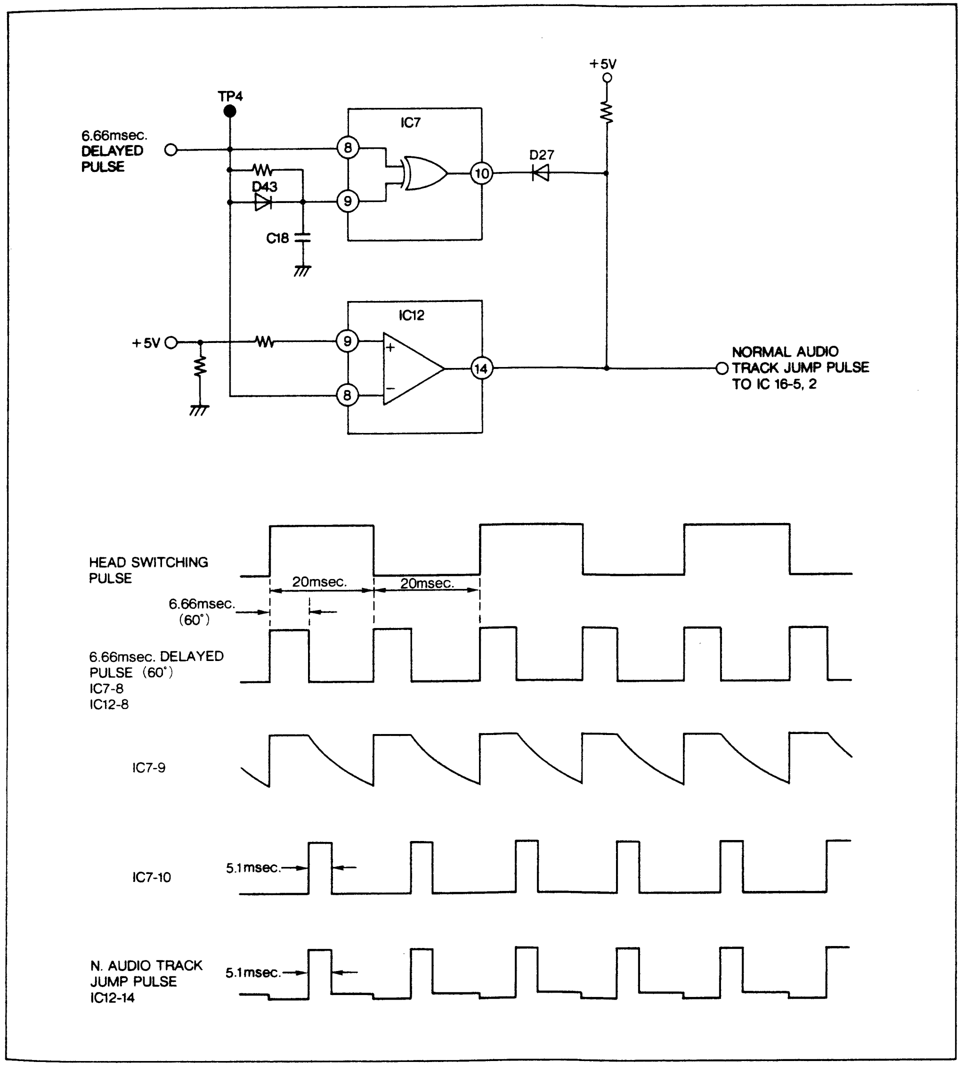

+5V
TP4
6.66msec.
DELAYED
PULSE
IC7
D27
D43
C18
IC12
+5V
NORMAL AUDIO
TRACK JUMP PULSE
TO IC 16-5, 2
HEAD SWITCHING
PULSE
20msec.
20msec.
6.66msec.
(60°)
6.66msec. DELAYED
PULSE (60°)
IC7-8
IC12-8
IC7-9
IC7-10
5.1msec.
N. AUDIO TRACK
JUMP PULSE
IC12-14
5.1msec.

Figure 2–27 Normal Audio Jump Pulse

switching pulse is applied to pin 6 of IC16 and the positive head switching pulse to pin 3.
The outputs at pins 4 and 10 of IC16 are gated by the flying erase high signal from pin 2 of IC15.
The outputs from pins 10 and 11 of IC16 go to the base of Q23 and Q24, which turn ON for 5.1 msec. as shown Figure 2–28.

10) Flying Erase Oscillation and Drive Circuit

The Flying Erase High signal from the flying erase holde circuit is applied to the base of QR10 which turns QR10 ON, Q10 turns QR11 OFF, and Q30, C37 and C38 circuit to oscillate at about 4 MHz.
The output from Q30 is buffered by Q31 which drives Q19 and Q25. Q20, Q21 and Q22 form the flying erase CH1 output stage, and Q26, Q27 and Q28 form the flying erase CH2 output stage.

The flying erase low signal from the flying eras holde circuit is applied to the base of Q27 and Q38 which turns Q27 and Q38 OFF to supply the flying erase current.
(See Figure 2–29)

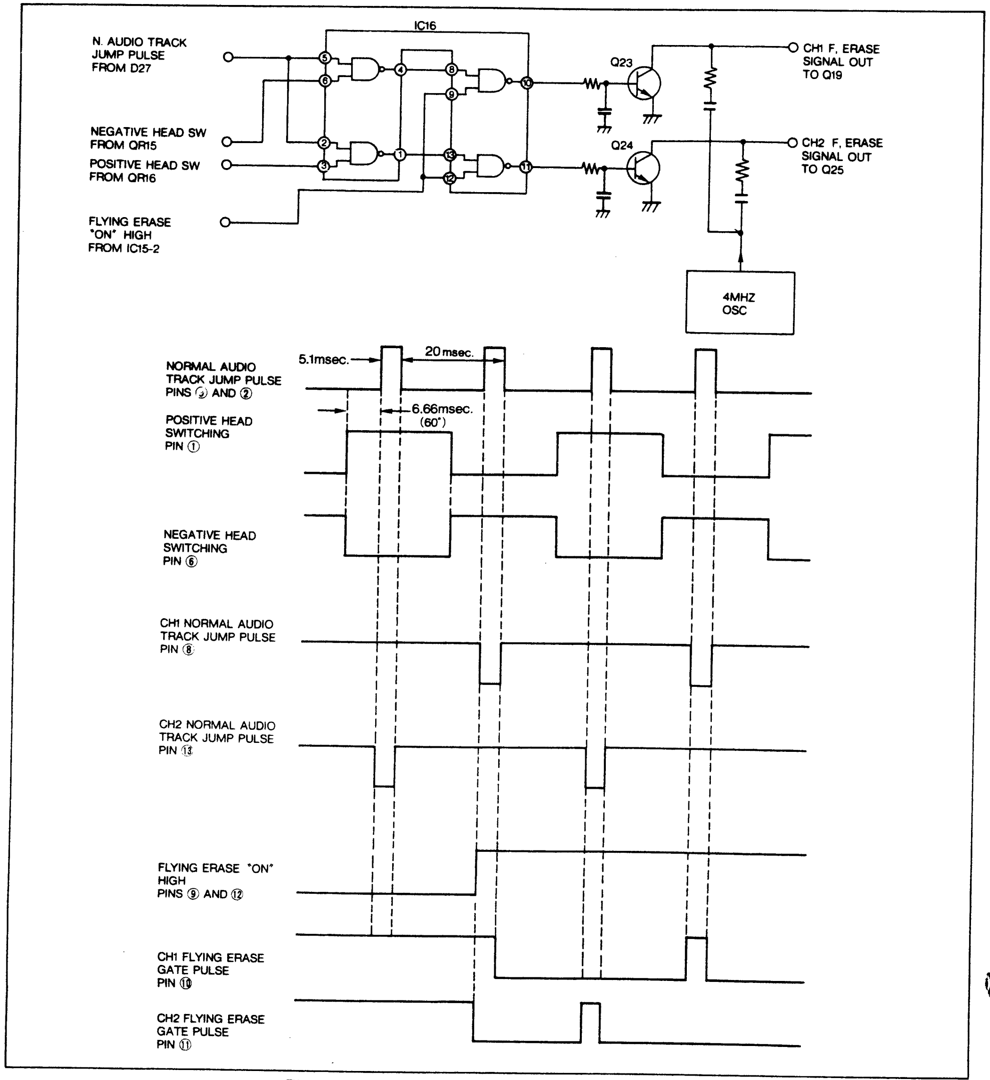

IC16
N. AUDIO TRACK JUMP PULSE FROM D27
NEGATIVE HEAD SW FROM QR15
POSITIVE HEAD SW FROM QR16
FLYING ERASE "ON" HIGH FROM IC15-2
Q23
Q24
CH1 F, ERASE SIGNAL OUT TO Q19
CH2 F, ERASE SIGNAL OUT TO Q25
4MHZ OSC
5.1msec.
20 msec.
6.66msec. (60°)
NORMAL AUDIO TRACK JUMP PULSE PINS ⑤ AND ②
POSITIVE HEAD SWITCHING PIN ①
NEGATIVE HEAD SWITCHING PIN ⑥
CH1 NORMAL AUDIO TRACK JUMP PULSE PIN ⑧
CH2 NORMAL AUDIO TRACK JUMP PULSE PIN ⑬
FLYING ERASE "ON" HIGH PINS ⑨ AND ⑫
CH1 FLYING ERASE GATE PULSE PIN ⑩
CH2 FLYING ERASE GATE PULSE PIN ⑪

Figure 2–28 Normal Audio Jump Gate Circuit

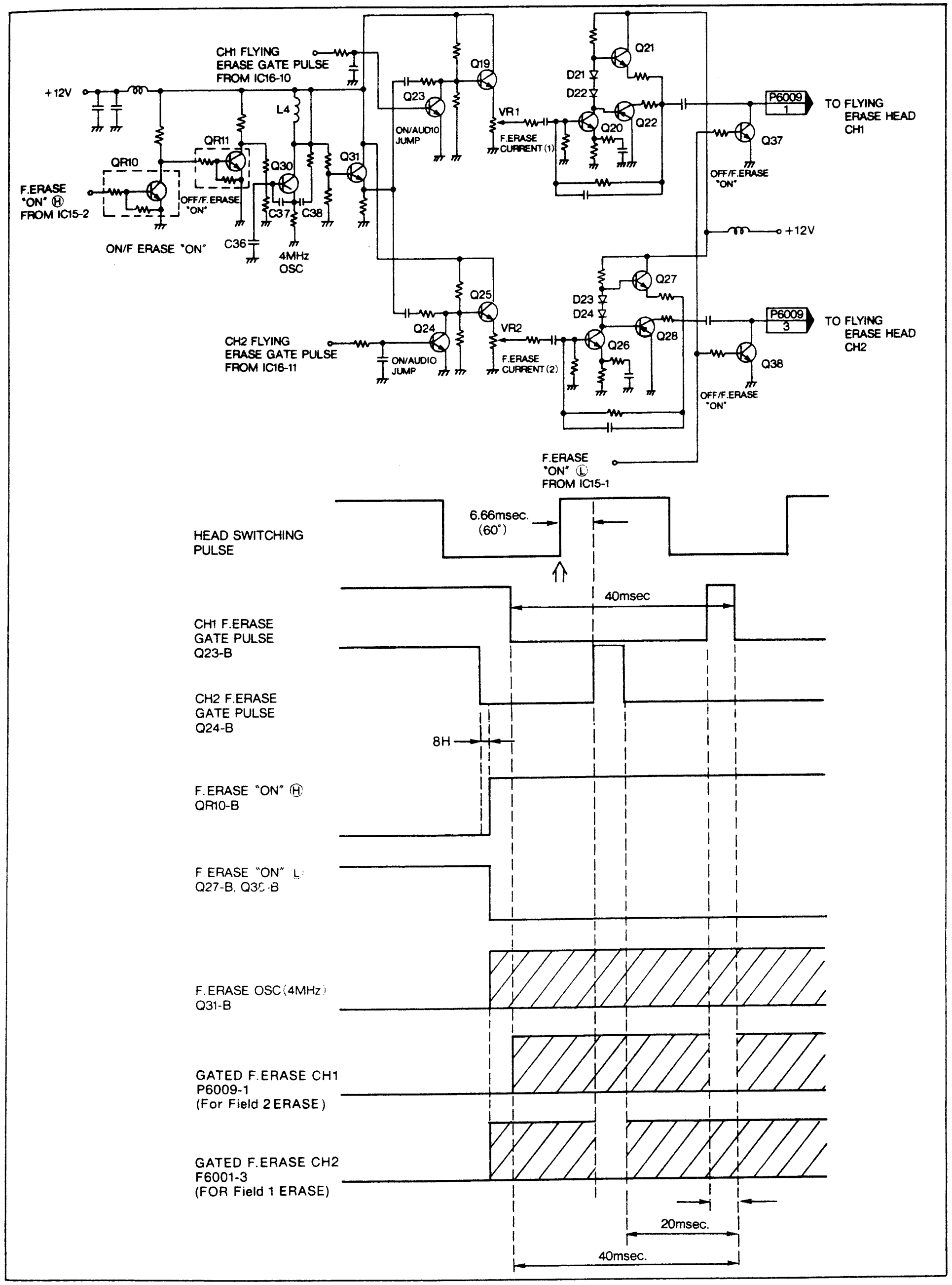

CH1 FLYING ERASE GATE PULSE FROM IC16-10
+12V
L4
QR11
QR10
Q30
Q31
C36
C37
C38
4MHz OSC
F.ERASE "ON" Ⓗ FROM IC15-2
OFF/F.ERASE "ON"
ON/F ERASE "ON"
Q23
Q19
ON/AUDIO JUMP
VR1
F.ERASE CURRENT (1)
Q21
D21
D22
Q20
Q22
P6009 1
TO FLYING ERASE HEAD CH1
Q37
OFF/F.ERASE "ON"
+12V
Q25
Q24
Q27
D23
D24
Q26
Q28
VR2
F.ERASE CURRENT (2)
CH2 FLYING ERASE GATE PULSE FROM IC16-11
P6009 3
TO FLYING ERASE HEAD CH2
Q38
F.ERASE "ON" Ⓛ FROM IC15-1
6.66msec. (60°)
40msec
8H
20msec.
40msec.
HEAD SWITCHING PULSE
CH1 F.ERASE GATE PULSE Q23-B
CH2 F.ERASE GATE PULSE Q24-B
F.ERASE "ON" Ⓗ QR10-B
F.ERASE "ON" Ⓛ Q27-B, Q38-B
F.ERASE OSC (4MHz) Q31-B
GATED F.ERASE CH1 P6009-1 (For Field 2 ERASE)
GATED F.ERASE CH2 F6001-3 (FOR Field 1 ERASE)

Figure 2–29 Flying Erase Oscillation Circuit

11) HD Audio Head Switching Pulse

As can be refered in general discription, the + 60 degrees offset of the HD audio heads requires −120 degrees (13.33 msec) shifted head switching pulse.
The clock input of D−type flip−flop is triggered by −120 degrees (13.33 msec) shifted pulse at pin 11 of IC15, and the video head switching pulse is applied to data input of IC15−9 which then produces the −120 degrees delayed head switching pulse at pin 12 of IC15 as shown in Figure 2−30.

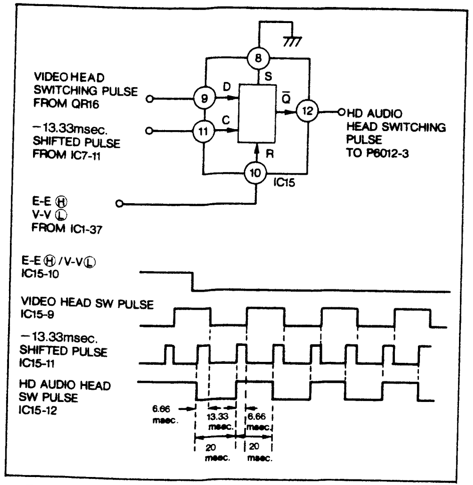

VIDEO HEAD SWITCHING PULSE FROM QR16
−13.33msec. SHIFTED PULSE FROM IC7-11
E-E Ⓗ V-V Ⓛ FROM IC1-37
8
9
11
10
12
D
C
S
R
Q̄
IC15
HD AUDIO HEAD SWITCHING PULSE TO P6012-3
E-E Ⓗ / V-V Ⓛ IC15-10
VIDEO HEAD SW PULSE IC15-9
−13.33msec. SHIFTED PULSE IC15-11
HD AUDIO HEAD SW PULSE IC15-12
6.66 msec.
13.33 msec.
6.66 msec.
20 msec.
20 msec.

Figure 2−30 HD Audio Head Switching Circuit

2−4. Key Board Circuit

General Description

The Key Board (Microcomputer) Circuit is located on the front panel. The purpose of this circuit is to sense the operating mode selected by the key and illuminate the desired mode LED when a key is pressed.
In addition, the control signal (CTL) from the tape (Playback mode) or 1/2 counted down V sync (Recording mode) is read out in hour / minute / second / Frame units and is displayed on the counter display.

1) Mode Select Key Matrix Circuit

When an operation Key is pressed, the scan pulses from microcomputer IC2 go to the operation Keys and one of the scan pulse is returned to the microcomputer IC2.
The Key matrix circuit can be defined by function, input and output enable, as shown in Figure 2−31.
For example, When the FF Key is pressed, the PEO output SCAN SIGNAL from pin 33 of microcomputer IC2 is sent to the PB1 input, pin 17 of IC2.
Then the information that the PB1 port has received is processed inside the microcomputer IC2, recognized as a request for FF, and the FF serial data is applied to other microcomputer through the serial data line.
The relationship of the input port and scan pulese is shown in Figure 2−31.

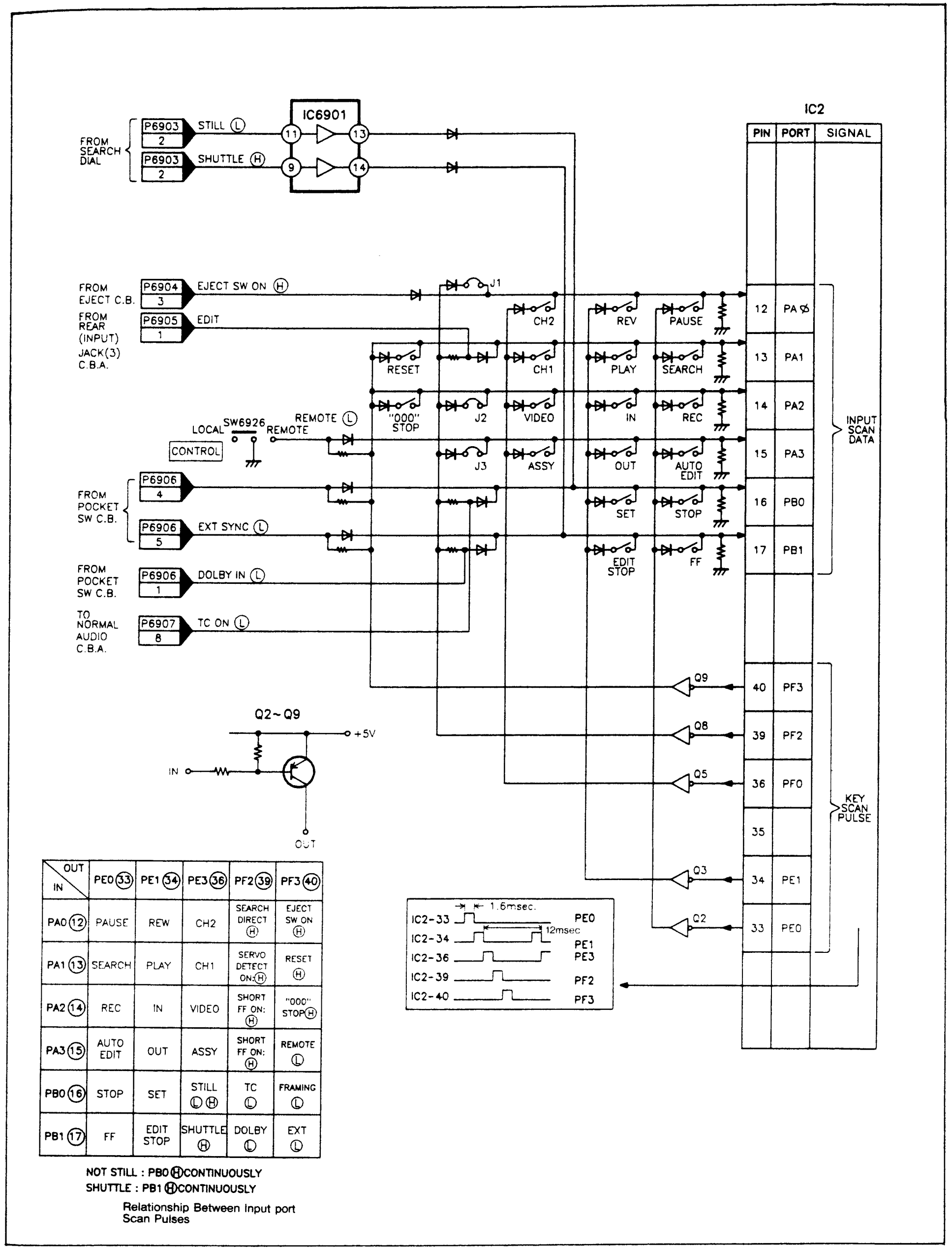
2) Mode Alternation Jumper

In order to extend the user's applications, the functions of the direct search dial, short FF and auto REW can be achieved by connecting or disconnecting the mode alternation jumpers J1, J2 and J3. The function table is in Figure 2−32.

J1 (DIRECT SEARCH)	OPEN	WHEN THE SEARCH DIAL IS ROTATED DURING THE STOP MODE. THE DECK GOES TO SEARCH MODE.
	CONNECT	THE DIRECT SEARCH IS NOT OPERATED.
J2 (SHORT FF)	CONNECT	THE UNIT WILL WIND THE TAPE SHORTLY. WHEN THE TAPE BEGINNING IS DETECTED.
	OPEN	THE UNIT WILL STOP. WHEN THE TAPE BEGINNING IS DETECTED.
J3 (AUTO REV)	CONNECT	THE UNIT WILL REWIND THE TAPE TO THE TAPE BEGINNING WHEN THE TAPE END IS DETECTED.
	OPEN	THE UNIT WILL STOP. WHEN THE TAPE END IS DETECTED.

= FACTORY STANDARD

Figure 2−32 Mode Alternation Jumpers


FROM SEARCH DIAL
P6903 2 STILL Ⓛ
P6903 2 SHUTTLE Ⓗ
IC6901
11
13
9
14
FROM EJECT C.B.
P6904 3 EJECT SW ON Ⓗ
FROM REAR (INPUT) JACK(3) C.B.A.
P6905 1 EDIT
J1
CH2
REV
PAUSE
RESET
CH1
PLAY
SEARCH
LOCAL
SW6926
REMOTE
REMOTE Ⓛ
CONTROL
"000" STOP
J2
VIDEO
IN
REC
J3
ASSY
OUT
AUTO EDIT
FROM POCKET SW C.B.
P6906 4
P6906 5 EXT SYNC Ⓛ
SET
STOP
EDIT STOP
FF
FROM POCKET SW C.B.
P6906 1 DOLBY IN Ⓛ
TO NORMAL AUDIO C.B.A.
P6907 8 TC ON Ⓛ
Q2~Q9
+5V
IN
OUT
Q9
Q8
Q5
Q3
Q2
IC2
PIN
PORT
SIGNAL
12 PA0
13 PA1
14 PA2
15 PA3
16 PB0
17 PB1
INPUT SCAN DATA
40 PF3
39 PF2
36 PF0
35
34 PE1
33 PE0
KEY SCAN PULSE
1.6msec.
12msec
IC2-33 PE0
IC2-34 PE1
IC2-36 PE3
IC2-39 PF2
IC2-40 PF3

OUT / IN	PE0㉝	PE1㉞	PE3㊱	PF2㊴	PF3㊵
PA0⑫	PAUSE	REW	CH2	SEARCH DIRECT Ⓗ	EJECT SW ON Ⓗ
PA1⑬	SEARCH	PLAY	CH1	SERVO DETECT ON:Ⓗ	RESET Ⓗ
PA2⑭	REC	IN	VIDEO	SHORT FF ON: Ⓗ	"000" STOPⒽ
PA3⑮	AUTO EDIT	OUT	ASSY	SHORT FF ON: Ⓗ	REMOTE Ⓛ
PB0⑯	STOP	SET	STILL Ⓛ Ⓗ	TC Ⓛ	FRAMING Ⓛ
PB1⑰	FF	EDIT STOP	SHUTTLE Ⓗ	DOLBY Ⓛ	EXT Ⓛ

NOT STILL : PB0 ⒽCONTINUOUSLY
SHUTTLE : PB1 ⒽCONTINUOUSLY

Relationship Between Input port
Scan Pulses

Figure 2−31 Key Matrix Circuit

3) LED Illumination Circuit

A LED illumination circuit is used to illuminate the desired mode LED when an operation Key or mode is selected, and is performed by the Key board microcomputer IC2.
For example, when the REW Key is pressed, a low signal is sent from pin 33 of IC2 to the transistor Q2, and Q2 turns on.
At the same time, pin 31 of IC2 goes high and Q17 turns on, REW LED is therefore illuminated.
(See Figure 2–33).

4) Filament Circuit

Filament Circuit is made of an oscillation circuit comprising transformer T1, transistor Q10, R47 and C7. Output from T1 is fed to filaments. The −30V inverter power source driving the Counter circuit is generated by T1, D3, D5, and C8. (See Figure 2–34).

5) Tape Counter Display

The control pulses which were recorded on the tape at a 25Hz rate, are read whenever the tape is in motion and sent to pin 22 of IC1 on the interface C.B.A. The same microcomputer sends the CTL serial data to IC2 on the Key board C.B.A.

The counter microcomputer (IC2) contains an eight bit counter which translates the count into an eight digit number formatted into hours, minutes, seconds and frames.
It then sequentially outputs the eight segment output representing a digit of that data at ports PG and PH pins 1–8 of IC2. As each digit segment data is output, the program also enables one of eight bits from ports PE and PF pins 33–40 of IC2, one bit at a time. (See Figure 2–34)

6) Search Dial Circuit

Press the Search Button and the unit is in the Search Mode. Then rotate the Search Dial and search for the desired video. By rotating the dial clockwise, playback will take place in the forward direction (lamp lights) : by rotating it counterclockwise, playback will take place in the reverse direction (lamp lights). By pressing the dial, the Shuttle Mode or Jog Mode will be alternately activated each time the dial is pressed. Also, a lamp at the left of the dial will light to indicate the activated mode.
The search dial consists of 4 LED and photo transistor pairs separated by an opaque disk and photo interrupter. Figure 2–35 shows the disk, photo interrupter and LED/phototransistor arrangement.

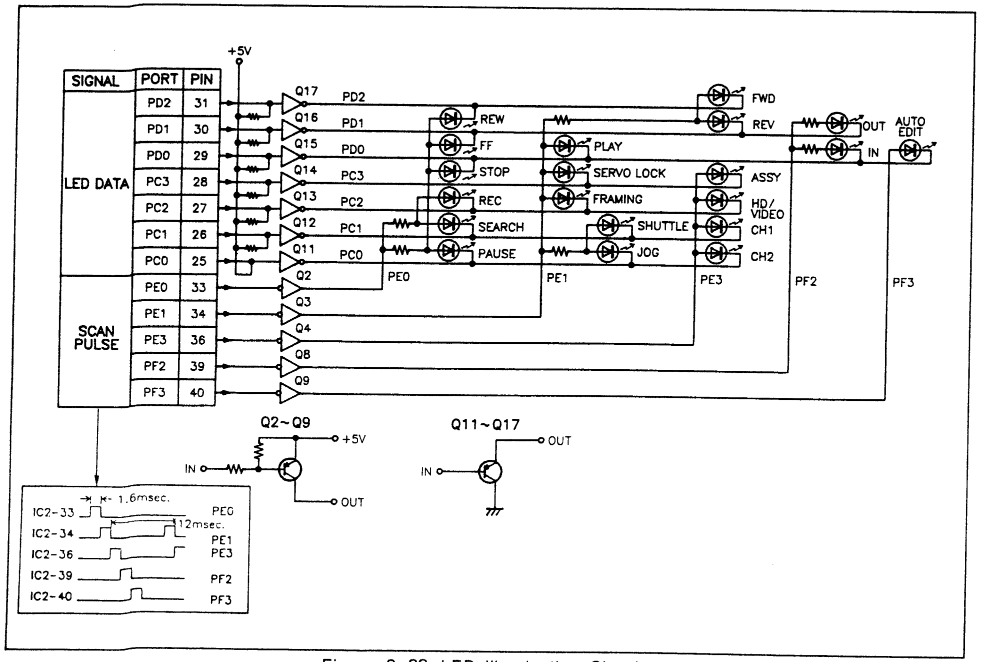

+5V
SIGNAL
PORT
PIN
LED DATA
SCAN PULSE
PD2 31
PD1 30
PD0 29
PC3 28
PC2 27
PC1 26
PC0 25
PE0 33
PE1 34
PE3 36
PF2 39
PF3 40
Q17
Q16
Q15
Q14
Q13
Q12
Q11
Q2
Q3
Q4
Q8
Q9
FWD
REV
REW
FF
STOP
REC
SEARCH
PAUSE
PLAY
SERVO LOCK
FRAMING
SHUTTLE
JOG
ASSY
HD/VIDEO
CH1
CH2
OUT
IN
AUTO EDIT
PE0
PE1
PE3
PF2
PF3
Q2~Q9
Q11~Q17
IN
OUT
+5V
1.6msec.
12msec.
IC2-33
IC2-34
IC2-36
IC2-39
IC2-40

Figure 2–33 LED Illumination Circuit

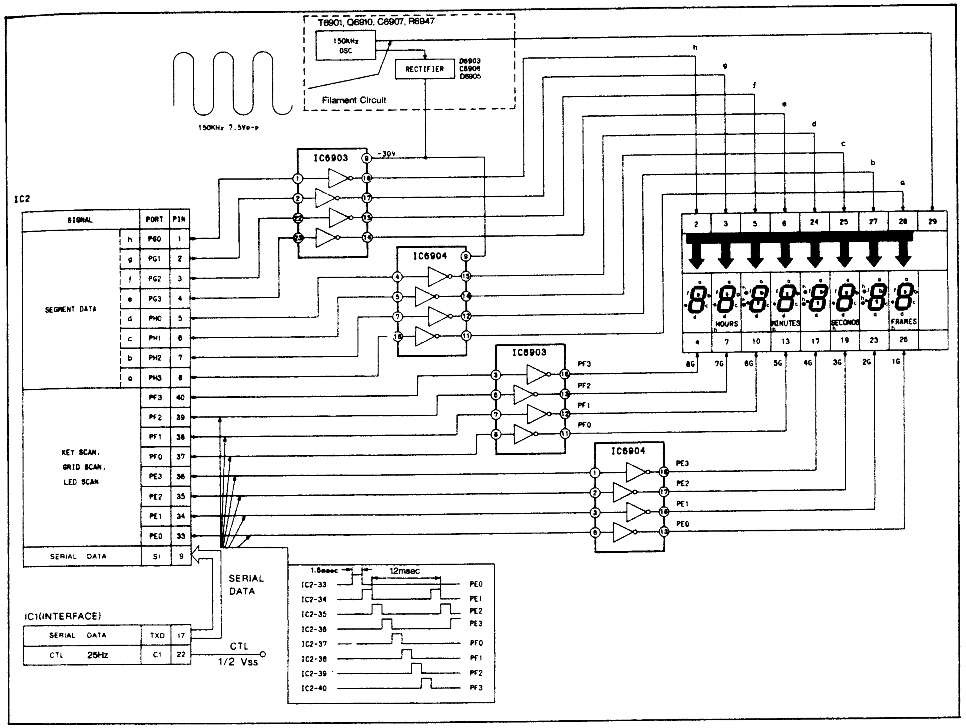
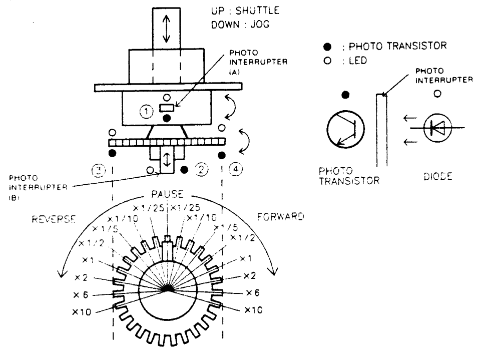

T6901, Q6910, C6907, R6947
150KHz OSC
RECTIFIER
D6903
C6908
D6905
Filament Circuit
150KHz 7.5Vp-p
IC6903
-30V
IC6904
IC6903
IC6904
IC2
SIGNAL
PORT
PIN
SEGMENT DATA
h PG0 1
g PG1 2
f PG2 3
e PG3 4
d PH0 5
c PH1 6
b PH2 7
a PH3 8
KEY SCAN.
GRID SCAN.
LED SCAN
PF3 40
PF2 39
PF1 38
PF0 37
PE3 36
PE2 35
PE1 34
PE0 33
SERIAL DATA S1 9
SERIAL DATA
IC1(INTERFACE)
SERIAL DATA TXD 17
CTL 25Hz C1 22
CTL
1/2 Vss
1.6msec
12msec
IC2-33
IC2-34
IC2-35
IC2-36
IC2-37
IC2-38
IC2-39
IC2-40
PE0
PE1
PE2
PE3
PF0
PF1
PF2
PF3
HOURS
MINUTES
SECONDS
FRAMES

Figure 2–34 Tape Counter Display


UP : SHUTTLE
DOWN : JOG
PHOTO INTERRUPTER (A)
PHOTO INTERRUPTER (B)
①
②
③
④
PAUSE
REVERSE
FORWARD
×1/25
×1/10
×1/5
×1/2
×1
×2
×6
×10
● : PHOTO TRANSISTOR
○ : LED
PHOTO INTERRUPTER
PHOTO TRANSISTOR
DIODE

MODE \ TR	PHOTO TRANSITOTOR ①	②	③	④
PAUSE/ STILL	OFF			
JOG	OFF	ON	⎍⎍⎍⎍	⎍⎍⎍⎍
SHUTTLE (SEARCH)	ON	OFF	⎍⎍⎍⎍	⎍⎍⎍⎍

Figure 2–35 Search Dial Unit

A. Photo Transistor 1

When the search dial knob is set to the "Pause/still" position, the photo interrupter (A) enters between Phototransistor/LED 1 so that the phototransistor 1 is turned off as shown in Figure 2-35.

The photo interrupter (A) returns to the "Pause" position when the search dial is depressed to the jog mode.
In the procedure above the pause low signal is amplified by IC1 and sent to pin 16 of IC2. Then microcomputer IC2 recognizes it as the Pause signal.

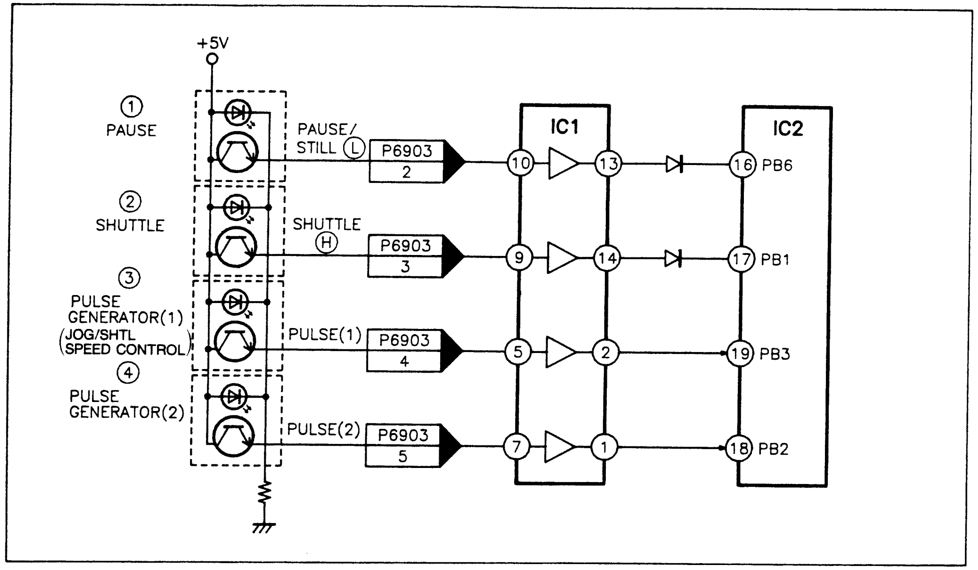


Figure 2-36 Search Dial Circuit

CCW ← FROM ● → CW

PLAYBACK DIRECTION	REVERSE									FORWARD							
PLAYBACK SPEED	× 10	× 5	× 2	× 1	× 1/2	× 1/5	× 1/10	× 1/25	PAUSE	× 1/25	× 1/10	× 1/5	× 1/2	× 1	× 2	× 5	× 10
PHASE	-90°	-90°	-90°	-90°	-90°	-90°	-90°	-90°	0	+90°	+90°	+90°	+90°	+90°	+90°	+90°	+90°
NUMBER OF PULSE	8	7	6	5	4	3	2	1		1	2	3	4	5	6	7	8

● CW → FROM REV ×10 ← CCW ● FROM FWD ×10

PHASE	+90°	+90°	+90°	+90°	+90°	+90°	+90°	+90°	±90°	-90°	-90°	-90°	-90°	-90°	-90°	-90°	-90°
NUMBER OF PULSE	0	1	2	3	4	5	6	7	8	7	6	5	4	3	2	1	0

Figure 2-37 Shuttle Speed Table

B. Photo transistor 2

When the photo interrupter is in the down position as shown in Figure 2-35. Transistor 2 is turned off. This is accomplised by depressing the search dial knob to the jog mode. In this procedure the jog low signal (shuttle high) is set to pin 17 of IC2, and microcomputer IC2 recognizes it either as a jog or a shuttle mode. (See Figure 2-36).

C. Photo transistors 3 and 4:

Pulses are generated by the photo transistor being ON/OFF by rotation of the rotary disc with thirty seven slits that is rotated by the search dial knob. Each of these pulses, 1 and 2, is different in phase by 90 degrees. When turning in the forward direction, pulse 1 is +90 degrees, and in the reverse direction, pulse 2 is −90 degrees.
This difference in pulse phase enables microcomputer IC2 to recognize the rotation to forward or reverse. (See Figure 2-36).

Shuttle:
The pulse generated by the photo transistor 1 is shaped by IC1 and fed to pin 19 of IC2.
Forward x 1/25 mode is made when a pulse of +90 degrees is applied to pin 19 of IC2, and forward x 10 mode is made when eight pulses of +90 degrees are applied to it. X 2 mode is made when two pulses of −90 degrees are applied to the pin of 19 of IC2 in the forward x 10 mode as shown Figures 2-36 and 2-37.

Jog:
The pulse width of pin 19 of IC2 is changed proportionally to the rotation speed of the search dial knob when it is rotated in the jog mode. Therefore, the speed of pause to x 1/5 can be controlled by the corresponding pulse width as shown in Figure 2-38.
Intermittent drive of x 1/25 speed is made in proportion to the falling edge of its pulse when the pulse width is more than 121msec.

2-5. Interface Circuit

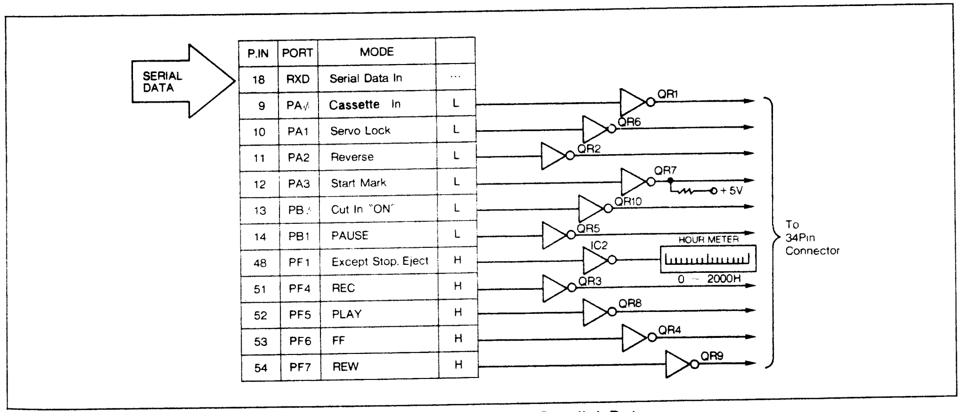
General Description

The AG-6500 can be combined in a system with an editing controller AG-A650 and NV-A500, Remote Controller AG-A600 and NV-A505.

The interface microcomputer circuit the serial data to parallel data and parallel data to serial data conversion required for the above controllers.
The interface microcomputer (IC1) is operated as the host microcomputer for serial data transmission, generating serial clock signal, interrupt request signal, and serial data and interfaces with other microcomputers.
See the section of the serial data transmission system for details.
The hour meter is installed on the interface C.B.A. as additional device for counting operation hours of the unit except when it is in the stop and eject mode. Unpredictable trouble can be reduced to a large extent if regular maintenance is made referring to this hour meter.

PULSE WIDTH AT PIN19 OF IC2	SPEED
MORE THAN 121msec.	×1/25 INTERMITTENT PULSE DRIVE
42msec.~120msec.	× 1/25
15msec.~41msec.	× 1/10
LESS THAN 14msec.	× 1/5

Figure 2-38 Jog Speed



P.IN	PORT	MODE	
18	RXD	Serial Data In	···
9	PA0	Cassette In	L
10	PA1	Servo Lock	L
11	PA2	Reverse	L
12	PA3	Start Mark	L
13	PB0	Cut In "ON"	L
14	PB1	PAUSE	L
48	PF1	Except Stop. Eject	H
51	PF4	REC	H
52	PF5	PLAY	H
53	PF6	FF	H
54	PF7	REW	H

Figure 2-39 Serial Data to Parallel Data

1) Serial to Parallel Data Modulation
Serial Data from other microcomputers is applied to pin 18 of IC1. The serial data is processed into parallel data by the serial interface inside IC1, and then to the controler connected to the 34 pin connector as shown in Figure 2-40.

2) Parallel to serial Data Modulation

Parallel data from external controller input at IC1 pins 1–8, 15, 16, 20, 22, 24, 34–41, 47 and 49 are converted to serial data for the system control. Figure 2–41 shows the input and output signal at each pin of microcomputer IC1.

MODE / PIN NO.	REVERSE								FORWARD							
	×10	×6	×2	×1	×1/2	×1/5	×1/10	×1/25	×1/25	×1/10	×1/5	×1/2	×1	×2	×6	×10
REMOTE19 IC6201·3	L	H	L	H	L	H	L	H	H	L	H	L	H	L	H	L
REMOTE30 IC6201·2	H	H	H	H	L	L	L	L	L	L	L	L	H	H	H	H
REMOTE33 IC6201·1	L	L	H	H	H	H	L	L	L	L	H	H	H	H	L	L
FWD/REV IC6201·4	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H

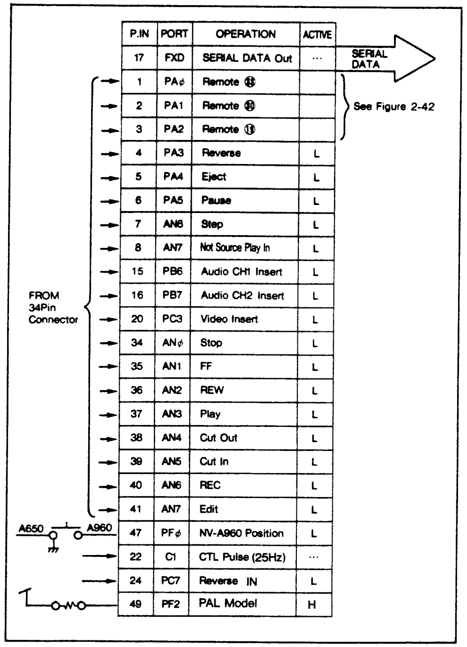
Figure 2–41 Remote Control Signal

2–6. REMOTE SEARCH CONTROL

The remote search dial generates a digital word which indicates a request for a different speed to VTR through the 34 pin connector and 34 pin control microcomputer.
The digital words are related to the pins as shown Figure 2–42.

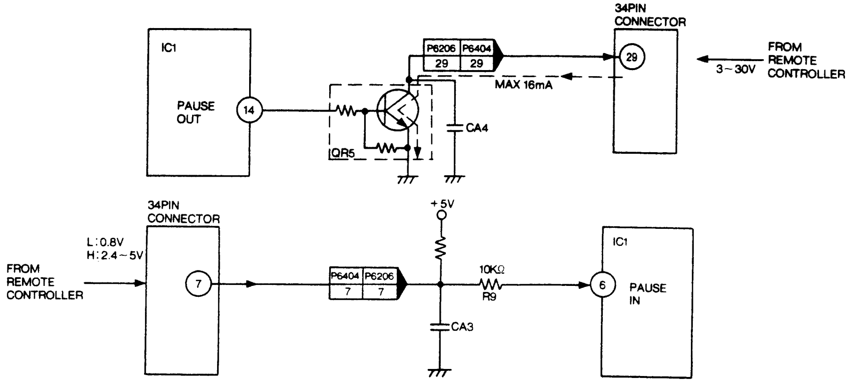
1) 34 pin Connector Information

The 34–pin remote control connector has been designed to the following specifications for the purpose of connecting the Panasonic editing controller or remote controller.


SERIAL DATA
See Figure 2-42
FROM 34Pin Connector
A650
A960

P.IN	PORT	OPERATION	ACTIVE
17	FXD	SERIAL DATA Out	···
1	PAϕ	Remote ㉝	
2	PA1	Remote ㉚	
3	PA2	Remote ⑲	
4	PA3	Reverse	L
5	PA4	Eject	L
6	PA5	Pause	L
7	AN6	Step	L
8	AN7	Not Source Play In	L
15	PB6	Audio CH1 Insert	L
16	PB7	Audio CH2 Insert	L
20	PC3	Video Insert	L
34	ANϕ	Stop	L
35	AN1	FF	L
36	AN2	REW	L
37	AN3	Play	L
38	AN4	Cut Out	L
39	AN5	Cut In	L
40	AN6	REC	L
41	AN7	Edit	L
47	PFϕ	NV-A960 Position	L
22	C1	CTL Pulse (25Hz)	···
24	PC7	Reverse IN	L
49	PF2	PAL Model	H

Figure 2—40 Parallel Data to Serial Data


34PIN CONNECTOR
FROM REMOTE CONTROLLER
3~30V
IC1
PAUSE OUT
14
P6206
P6404
29
29
MAX 16mA
CA4
QR5
34PIN CONNECTOR
L:0.8V
H:2.4~5V
FROM REMOTE CONTROLLER
7
+5V
P6404
P6206
7
7
10KΩ
R9
CA3
IC1
6
PAUSE IN

IN/OUT	P I N	SPECIFICATION
OUTPUT	⑥,⑪,⑭,㉓,㉔,㉕,㉖ ㉙,㉛	OPEN COLLECTOR OUTPUT (WITHOUT PULL-UP RESISTOR AT COLLECTOR) PULL-UP VOLTAGE FROM REMOTE CONTROLLER : 3V~30V MAXIMUM CURRENT AT EACH PIN : 16mA
	㉞	+12V, MAX200mA
INPUT	①,②,③,④,⑤,⑦,⑨ ⑩,⑮,⑯,⑰,⑲,㉑,㉒ ㉗,㉚,㉜,㉝	INPUT VOLTAGE : TTL LEVEL LOW : LESS THAN 0.8V HIGH : 2.4V~5V

Figure 2–42 34Pin Connector

3. Servo Section

3–1. SERVO (1) CIRCUIT
(REF. NO. 2000 SERIES)

GENERAL DESCRIPTION

The VTR is a mechanical device whose ability to move the tape by means of a capstan, must be precise and whose rotating video heads must be synchronized with the information that was recorded on the tape. The capstan and video head cylinder motor are constantly being measured and any deviation corrected. This is called Servo action and is necessary in video playback. If there were no servo action, there would be no useable playback at all. The servo circuit must control the speeds of the motors so that the information is played back just as recorded. It is worthwhile to mention here that the servo circuit traces "Control Pulse" during playback. A "Control Track" space is reserved on the tape for this purpose.
The video tracks are shown in Figure 3–1.

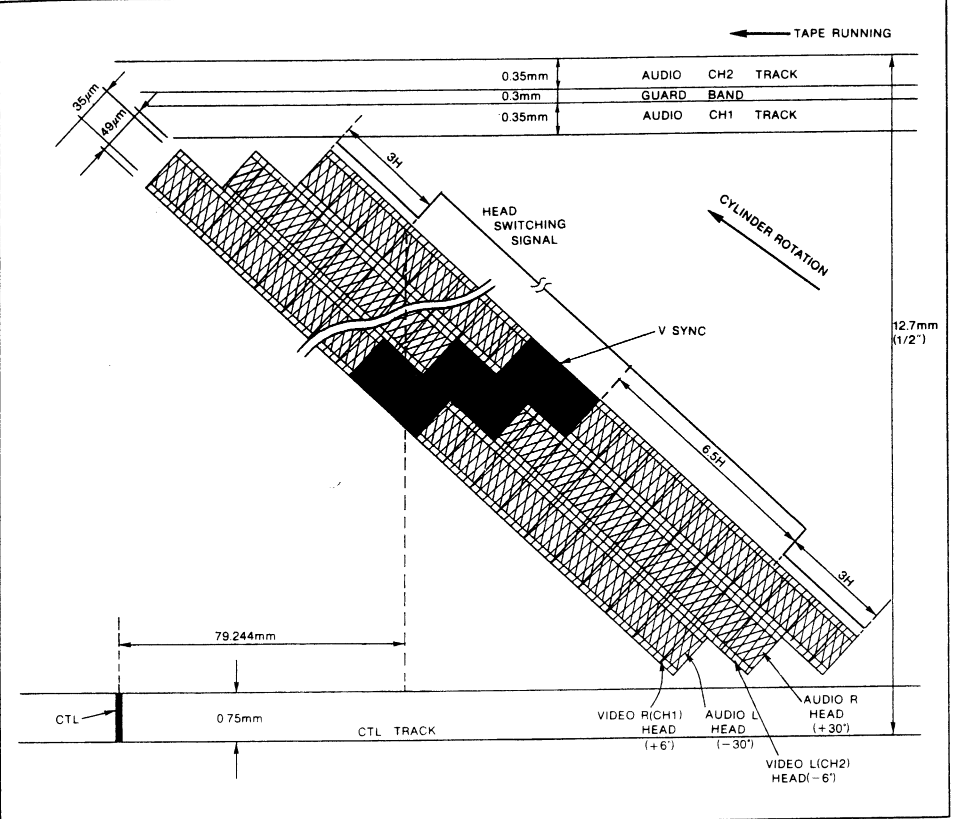

TAPE RUNNING
0.35mm
AUDIO CH2 TRACK
0.3mm
GUARD BAND
0.35mm
AUDIO CH1 TRACK
35μm
49μm
3H
HEAD SWITCHING SIGNAL
CYLINDER ROTATION
V SYNC
12.7mm (1/2")
6.5H
3H
79.244mm
CTL
0.75mm
CTL TRACK
VIDEO R(CH1) HEAD (+6°)
AUDIO L HEAD (−30°)
AUDIO R HEAD (+30°)
VIDEO L(CH2) HEAD(−6°)

Figure 3–1 Tape Pattern

1) Digital Speed Control

A Digital Speed Control circuit consists of the Digital Speed Comparator, the Pulse Width Modulator, and the Low Pass Filter.
The Digital Speed Comparator compares the actual FG frequency with a reference frequency and outputs Speed Error Data to the PWM (Pulse Width Modulator) circuit.
The FG signal is converted to the Latch Pulse and the Preset Pulse, both of which are synchronized to the Clock Pulse.
While these pulses are processed within the Digital Speed Comparator, NL (Number of Latch) Gate Pulse is produced. By the rising edge of the NL Gate Pulse, the "n bit" Gate starts to count (Digital Trapezoid), and by the preset pulse, the "n bit" Gate is reset. This process produces the repetitive "Trapezoid" waveform. When the motor speed is correct for the particular mode the Latch Pulse and the Preset Pulse would be positioned near the center of the virtual grade of the Digital Trapezoid(middle of the counter sequence). In this case, the error data will result in a 50% duty cycle pulse from the PWM circuit.
When the motor speed increases for any reason, the FG frequency becomes high. As a result, the Latch Pulse and Preset Pulse periods decrease and cause the n bit counter to be sampled sooner. In this case, the error data will result in a less than 50% duty cycle pulse from the PWM circuit.
When the motor speed decreases for any reason, the FG frequency becomes low. The Latch Pulse and Preset Pulse periods increase and the n bit count is sampled later. In this case, the error data will result in a greater than 50% duty cycle pulse from the PWM output.

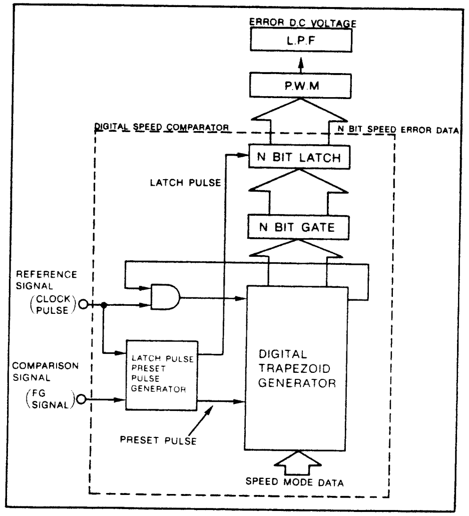

ERROR D.C VOLTAGE
L.P.F
P.W.M
DIGITAL SPEED COMPARATOR
N BIT SPEED ERROR DATA
N BIT LATCH
LATCH PULSE
N BIT GATE
REFERENCE SIGNAL
(CLOCK PULSE)
COMPARISON SIGNAL
(FG SIGNAL)
LATCH PULSE PRESET PULSE GENERATOR
DIGITAL TRAPEZOID GENERATOR
PRESET PULSE
SPEED MODE DATA

Figure 3–2 Digital Speed Comparator

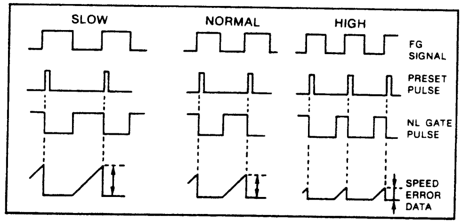

SLOW
NORMAL
HIGH
FG SIGNAL
PRESET PULSE
NL GATE PULSE
SPEED ERROR DATA

Figure 3–3 Digital Speed Control

2) Digital Phase Control

A Digital Phase Control circuit consists of the Digital Phase Comparator, the Pulse Width Modulator, and the Low Pass Filter.
The Digital Phase Comparator produces an output which indicates the phase difference between the Reference signal and the Comparison signal (Cylinder PG for Cylinder Phase Control, Control Signal for Capstan Phase Control) and outputs Phase Error Data to the PWM circuit.
The Comparison signal is applied to the Latch Pulse Generator and the Reference signal is applied to the Preset Pulse Generator.
Both of these pulses are synchronized with the Clock Pulse.
While the Reference signal is processed within the Digital Phase Comparator, NL Gate Pulse is produced.
By the rising edge of the NL Gate Pulse, the "n bit" Gate is started to count for Digital Trapezoid. The Preset Pulse, then causes the "n bit" Gate to reset, and the process is repeated with the next NL Gate pulse.
When the motor phase is just synchronized with the Reference signal, the Latch Pulse will be positioned near the center of the virtual grade of the Digital Trapezoid. In this case, the error data will result in a 50% duty cycle pulse from the PWM.
When the motor phase is advanced for any reason, the variable signal frequency becomes high. The Latch Pulse period will decrease, and the n bit counter will be sampled sooner. In this case, the error data to the PWM circuit will result in a less than 50% duty cycle pulse from the PWM circuit.
When the motor phase is delayed for some reason, the Comparison signal frequency becomes low. The Latch Pulse period will increase, and the n bit counter will be sampled later. In this case, the error data will result in a greater than 50% duty cycle pulse from the PWM circuit.

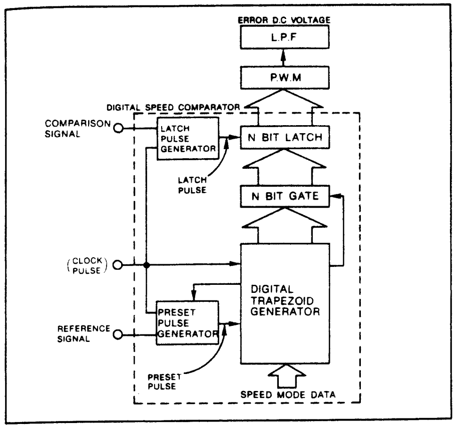
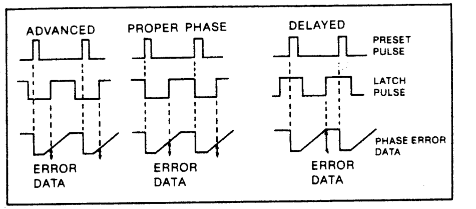

ERROR D.C VOLTAGE
L.P.F
P.W.M
DIGITAL SPEED COMPARATOR
COMPARISON SIGNAL
LATCH PULSE GENERATOR
N BIT LATCH
LATCH PULSE
N BIT GATE
(CLOCK PULSE)
DIGITAL TRAPEZOID GENERATOR
REFERENCE SIGNAL
PRESET PULSE GENERATOR
PRESET PULSE
SPEED MODE DATA

Figure 3–4 Digital Phase Comparator


ADVANCED
PROPER PHASE
DELAYED
PRESET PULSE
LATCH PULSE
PHASE ERROR DATA
ERROR DATA
ERROR DATA
ERROR DATA

Figur 3–5 Digital Phase Control

3) Digital PWM Circuit (Pulse Width Modulator)

The error data from the phase or speed comparator is applied to the PWM circuit to convert it from digital to analog. If the error data is applied as digital data, many pins would be necessary, in order to represent the number. Therefore, the error data is converted into a variable pulse width signal by the Digital PWM circuit.

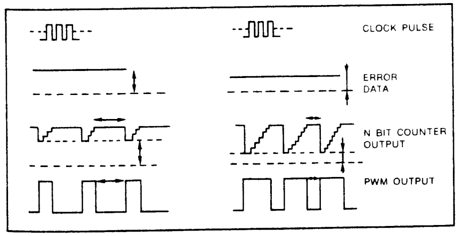

CLOCK PULSE
ERROR DATA
N BIT COUNTER OUTPUT
PWM OUTPUT

Figure 3–6 Digital PWM Circuit

4) Functions By Jumpers

On the Servo (1) circuit, two more functions can be added by connecting jumpers. (See Figure 3–7)

METHOD	OPERATION	CONTENT
Connection between IC2007-17 and ground	Even if servo doesn't work well (not locked), servo lock lamp will light.	It is possible to discriminate whether servo circuit or lamp drive circuit makes trouble.

Fig. 3–7 Functions by Jumpers

5) Capstan / Cylinder Lock Detection Circuit

Jumper connected. Servo Lock Lamp will light up. To check whether the LED drive circuit or the servo circuit is broken as shown in Figure 3–8.

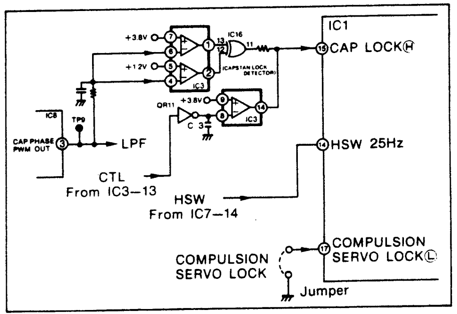

IC1
+3.8V
+12V
IC16
IC3
CAPSTAN LOCK DETECTOR
CAP LOCK(H)
QR11
+3.8V
C 3
TP9
IC8
CAP PHASE PWM OUT
LPF
CTL
From IC3—13
HSW 25Hz
HSW
From IC7—14
COMPULSION SERVO LOCK
COMPULSION SERVO LOCK(L)
Jumper

Figure 3–8 Cap/Cyl Lock Detection

CIRCUIT DESCRIPTION

1) Cylinder Servo circuit

A. Cylinder Speed Control–Recording Mode/ Playback Mode

The cylinder FG signal is produced by the ring magnets on the flywheel and the cylinder drive IC2024.
The cylinder FG frequency reflects the speed of the cylinder motor.
The cylinder FG signal is changed to 200Hz square wave within IC2024 and is applied to IC2008–24 and IC2040–11. In the SS mode, the cylinder FG signal is then applied to the cylinder speed comparator within IC2008. The FG frequency which varies according to the cylinder speed, is converted into 8 bit digital speed error data. The digital speed error data is applied to the Pulse Width Modulator and is output at IC2008–28.
The PWM output is converted into a DC voltage by the low pass filter made up of R2201, and C2108. Then the speed error DC voltage is mixed with the phase error DC voltage.
In the normal mode, cylinder speed error voltage is produced using cylinder FG signals as shown in figure 3–10.

SIGNAL / MODE		REFERENCE SIGNAL	COMPARISON SIGNAL
REC	PHASE LOOP	INCOMING FRAME PULSE	HEAD SWITCHING 25Hz
	SPEED LOOP	CLOCK PULSE	CYLINDER FG 200Hz
P.B	PHASE LOOP	CLOCK PULSE	HEAD SWITCHING 25Hz
	SPEED LOOP	CLOCK PULSE	CYLINDER FG 200Hz

Figure 3—9 Cylinder Servo

B. Cylinder Phase Control—Recording Mode

The cylinder PG signal is applied to IC2007—17 where it is converted into the head switching signal and outputs from IC2007—14. The head switching signal is used in the cylinder phase control, in order to produce the latch pulse in the cylinder phase comparator. The head switching pulse, applied to IC2008—25, and reference signal made from the incoming frame pulse are together applied to the digital phase comparator. Since the head switching pulse varies according to the cylinder motor speed, and reference signal is also varied to match the H phase between the incoming signal and playback signal during editing, so that output of the digital phase comparator also varies accordingly. The 10 bit digital phase error data is applied to the Pulse Width Modulator (PWM) circuit. The width of the output pulse from the PWM circuit varies according to the cylinder motor speed.
The phase error data at IC2008—27 from the cylinder phase PWM circuit is converted into a DC voltage by the low pass filter made of R2204, R2371 and C2110.
Then the DC voltage is applied to the cylinder drive circuit with the DC voltage from the cylinder speed control.

C. Cylinder Phase Control—Playback Mode

In the case of the playback mode, the counted down clock signal is used to produce the digital trapezoid wave. This means that the trapezoid wave generator within the digital phase comparator has a self oscillation function in the playback mode. The clock pulse is produced from a crystal oscillator, therefore the clock pulse frequency is stable. The counted down clock signal is used as reference signal.

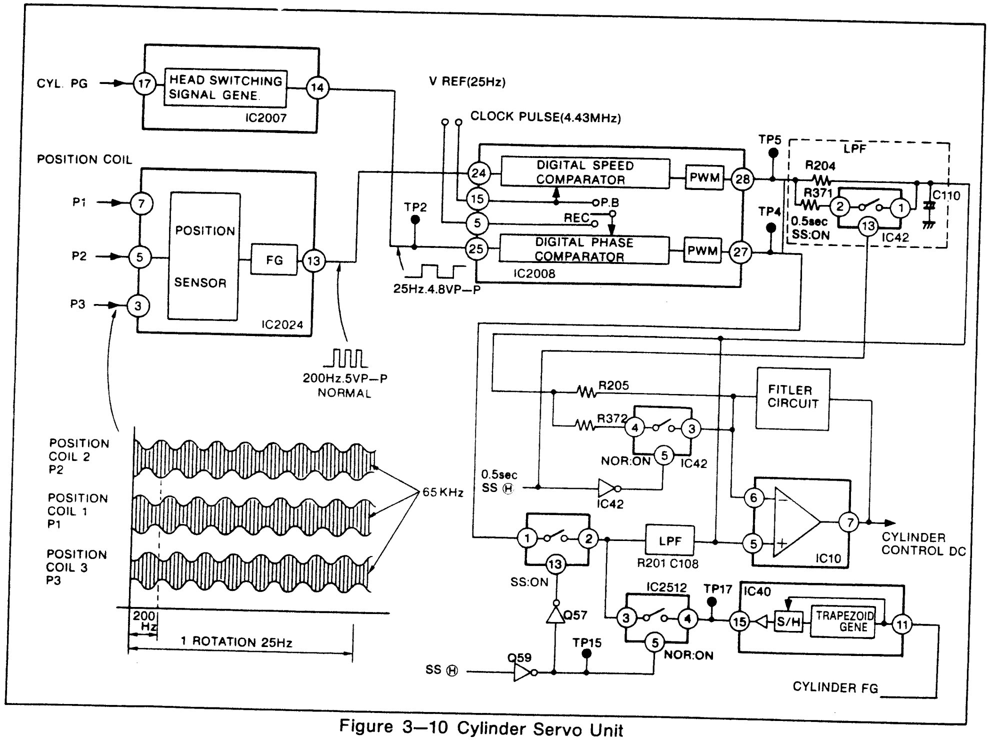

CYL. PG
17
HEAD SWITCHING SIGNAL GENE.
14
IC2007
V REF(25Hz)
CLOCK PULSE(4.43MHz)
POSITION COIL
P1
P2
P3
7
5
3
POSITION SENSOR
FG
13
IC2024
200Hz.5VP—P NORMAL
TP2
25Hz.4.8VP—P
24
15
5
25
DIGITAL SPEED COMPARATOR
P.B
REC
DIGITAL PHASE COMPARATOR
PWM
PWM
28
27
IC2008
TP5
TP4
LPF
R204
R371
C110
0.5sec SS:ON
IC42
R205
R372
FITLER CIRCUIT
NOR:ON
IC42
0.5sec SS Ⓗ
IC42
LPF
R201 C108
SS:ON
Q57
IC2512
TP17
IC40
S/H
TRAPEZOID GENE
NOR:ON
TP15
Q59
SS Ⓗ
IC10
CYLINDER CONTROL DC
CYLINDER FG
POSITION COIL 2 P2
POSITION COIL 1 P1
POSITION COIL 3 P3
65 KHz
200 Hz
1 ROTATION 25Hz

Figure 3—10 Cylinder Servo Unit

2) Capstan Servo Circuit

A. Capstan Speed Control
—Recording Mode/Playback Mode

The capstan FG signal, which shows the speed of the capstan motor, is counted down and changed into a square wave within IC2006 in the X1/5—X10 mode, and in other modes, namely X1/10, X1/25 slow modes. This frequency is multiplied according to the mode as shown in Figure 3—12.
The capstan FG signal is then applied to the capstan speed comparator within IC2008. The FG frequency which varies according to the capstan speed is converted into 8 bit digital speed error data. Then 8 bit speed error data is converted into variable width pulses by the PWM circuit and is output at IC2008—2.

The PWM output is applied to a low pass filter made of R2101, and C2040, in order to convert into a DC voltage. Then the speed error DC voltage is mixed with the phase error DC voltage coming from the capstan phase control.

SIGNAL / MODE		REFERENCE SIGNAL	COMPARISON SIGNAL
REC	PHASE LOOP	CLOCK PULSE	CAPSTAN PG 25Hz
	SPEED LOOP	CLOCK PULSE	CAPSTAN FG
P.B	PHASE LOOP	CLOCK PULSE	CONTROL PULSE
	SPEED LOOP	CLOCK PULSE	CAPSTAN FG

Figure 3—11 Capstan Servo

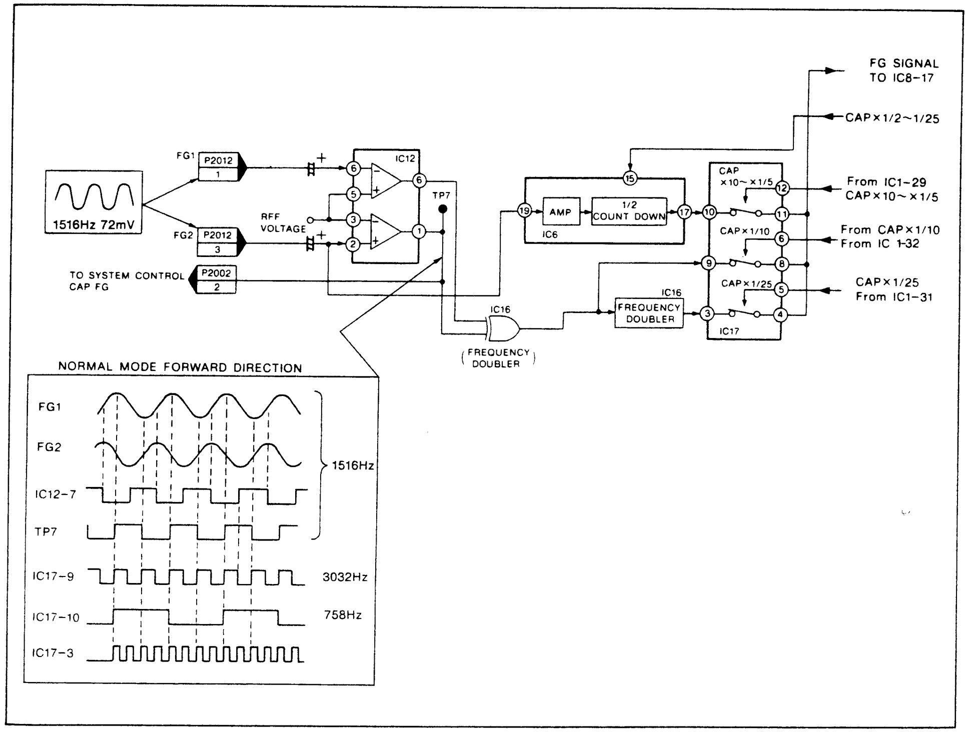

FG SIGNAL TO IC8—17
CAP×1/2~1/25
1516Hz 72mV
FG1
P2012 1
FG2
P2012 3
RFF VOLTAGE
IC12
TP7
TO SYSTEM CONTROL CAP FG
P2002 2
IC16
(FREQUENCY DOUBLER)
AMP
1/2 COUNT DOWN
IC6
CAP ×10~×1/5
CAP×1/10
CAP×1/25
IC17
IC16
FREQUENCY DOUBLER
From IC1—29 CAP×10~×1/5
From CAP×1/10 From IC 1-32
CAP×1/25 From IC1—31
NORMAL MODE FORWARD DIRECTION
FG1
FG2
1516Hz
IC12—7
TP7
IC17—9
3032Hz
IC17—10
758Hz
IC17—3

Figure 3—12 Capstan FG

B. Capstan Phase Control–Recording Mode

In the recording mode, the capstan motor should spin at a steady speed. So the counted down FG signal (PG signal: 25Hz) is synchronized with the reference signal. First, the counted down clock signal (25Hz) is used to produce the reference signal.
Then the capstan FG signal is applied to IC2008–17 and is again counted down to 25Hz. This counted down FG signal is called the capstan PG signal. The clock pulse is also used as a reference signal.
Further operation is the same as the cylinder phase control. 10 bit phase error data is produced and applied to the PMW circuit. The output of the PMW comes from IC2008–3 as variable width pulses. By the low pass filter consisting of R2100, R2104, C2039 and C2041 it is changed to a phase error DC voltage. The phase error DC voltage is sent to the capstan drive circuit through the amplifier circuit with the speed error DC voltage.

C. Capstan Phase Control–Playback Mode

To control the tape movement, the control signal on the tape is used as a sampling pulse.
First the control head picks up the control signal which is recorded on the control track. (This control signal (25Hz) is produced from the vertical sync of the incoming video signal in the record mode). The control signal is first applied to switchable gain amplifiers, then to the digital phase comparator as a comparison signal via the digital monostable multivibrator.
On the other hand, the clock pulse input to IC2008 is converted into a 25Hz square wave and output from IC2008–4. Then it is applied to the tracking M.M.V. By the TRACKING VR on the front panel, the time constant of the tracking M.M.V is changed, which means that the phase relationship between the capstan and the cylinder motor changes, since the clock pulse input to IC2008 is also used by cylinder servo as a reference. The output of the tracking M.M.V is applied to the digital phase comparator through IC2007–12 and IC2008–6 as a reference signal. In the colour framing mode, capatan phase is adjusted by CAP PHASE signal. Further operation is just the same as in the RECORDING MODE.

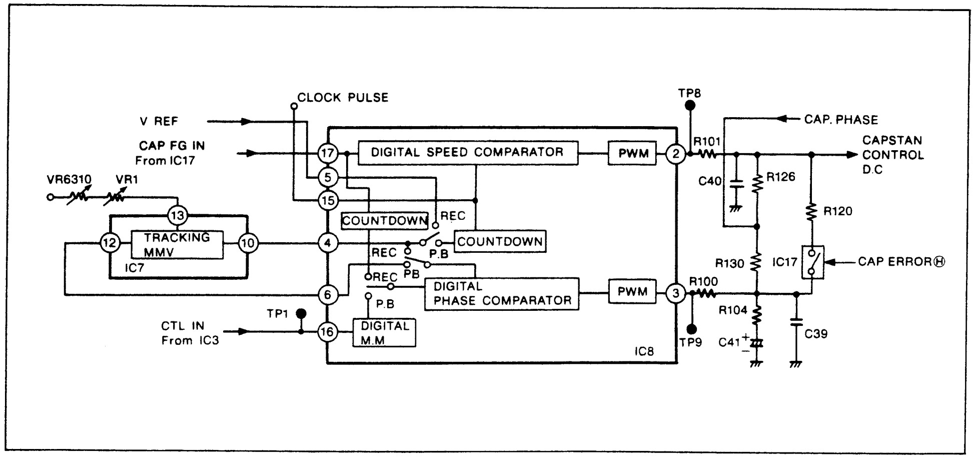

CLOCK PULSE
V REF
CAP FG IN
From IC17
VR6310
VR1
TRACKING
MMV
IC7
CTL IN
From IC3
TP1
DIGITAL SPEED COMPARATOR
PWM
COUNTDOWN
REC
COUNTDOWN
REC
P.B
DIGITAL
PHASE COMPARATOR
DIGITAL
M.M
IC8
TP8
TP9
R101
R100
C40
R126
R120
R130
IC17
R104
C41
C39
CAP. PHASE
CAPSTAN
CONTROL
D.C
CAP ERROR⊕

Figure 3–13 Capstan Servo Circuit

Control Pulse Circuit

In the slow playback modes, the CTL signal should be steadily picked up by the CTL head.
Therefore the gains of the amplifiers are changed in the following modes, FWD, REV, X(1/2 ~ X10), X(1/5), X(1/10), X(1/25).
For example, in FWD X(1/10) mode, the CTL signal picked up by the CTL head is fed to IC15 and IC7, finally sent to IC3 MMV.

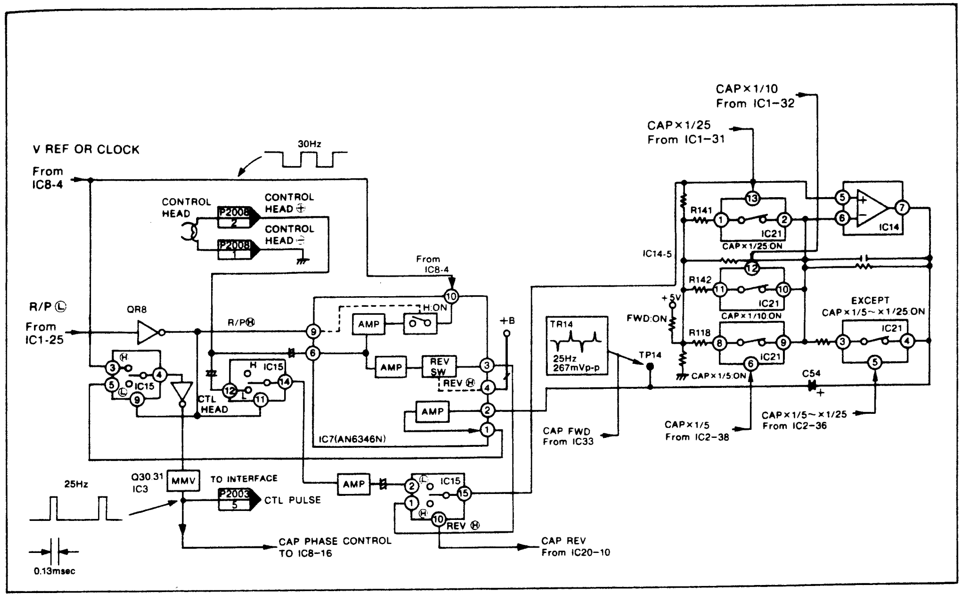

V REF OR CLOCK
From IC8-4
30Hz
CONTROL HEAD
P2008
CONTROL HEAD ⊕
CONTROL HEAD ⊖
From IC8-4
R/P Ⓛ
From IC1-25
OR8
R/P⊕
H ON
AMP
REV SW
REV ⊕
IC15
CTL HEAD
IC7(AN6346N)
+B
TR14
25Hz 267mVp-p
TP14
25Hz
Q3031 IC3
MMV
TO INTERFACE
P2003
CTL PULSE
CAP PHASE CONTROL TO IC8-16
CAP FWD From IC33
CAP REV From IC20-10
0.13msec
CAP×1/10 From IC1-32
CAP×1/25 From IC1-31
R141
IC21
CAP×1/25 ON
IC14
IC14-5
R142
CAP×1/10 ON
FWD ON
R118
CAP×1/5 ON
EXCEPT CAP×1/5~×1/25 ON
C54
CAP×1/5 From IC2-38
CAP×1/5~×1/25 From IC2-36

Figure 3–14 Control Pulse Circuit

Capstan Gain Compensator

The capstan motor speed must change to obtain a certain operating speed (search Playback mode).
This speed change is performed by the proper selection of the operational amplifier.
First, the DC voltage from the capstan servo control is applied to the three operational amplifiers inside of IC6. The operational amplifiers receive the mode information (Cap Gain B, Cap Gain C, and Cap X(1/2 ~ X1/25)), and the amplifiers gain are changed according to the mode.
Capstan Gain B signal is activated in X(6) and X(10) playback modes, and Capstan Gain C in X(2) playback mode (High).

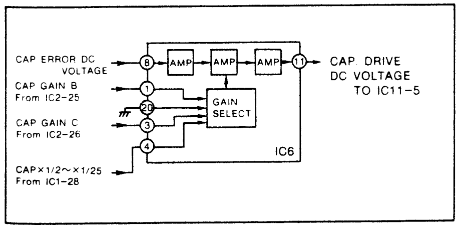

CAP ERROR DC VOLTAGE
CAP GAIN B From IC2-25
CAP GAIN C From IC2-26
CAP×1/2~×1/25 From IC1-28
AMP
GAIN SELECT
IC6
CAP DRIVE DC VOLTAGE TO IC11-5

Figure 3–15 Capstan Gain

3) CTL Masking circuit

The CTL head in this VTR picks up the control pulse at all time, even in the Jog or Shuttle mode.
To achieve error within +– 2 frames during editing, this VTR masks the periods where the CTL pulse won't be picked up by the CTL head to avoid miscounting frames.
This circuit, called the "CTL masking" circuit, uses capstan FG signals as a clock and the CTL pulses. It also detects the rotating as counter presets. Direction of the capstan motor by using the two capstan FG signals, and rejects any signals or noise during a certain period in each frame.

The CTL masking circuit is composed of the following circuits:

COUNTER
FEW/REV CTL MASKING GATES
PRESET PULSE GENERATOR
FWD/REV ROTATION DETECTOR
FWD/REV SWITCHING PULSE GENERATOR
RESET

A. COUNTER & MASKING GATES

ICs 22 & 23, along with the masking gates which follow, form the heart of the circuit. The Capstan FG signal (1516 Hz) is used as a clock on pin 10 of each IC, and a reset pulse derived from CTL is applied to pin 1. Waveforms 2 – 4 (figure 3–) are generated by the counter and gates with a new CTL arriving as a reset pulse each 60 counts of FG (1516/25 = 60). The outputs Q1–Q3 are applied to masking gates IC5 & 19, which produce waveforms 6 & 9. One of the two waveforms is selected, and passed to Q50 to mute the CTL line as required.

B. PRESET PULSE GENERATOR

IC4 & 5 comprise the generator which is used to reset the counter. Basically, the CTL pulses pass through this stage to the counter resets ("PE", pin 1). In addition, if the counter reaches 64, due to a missing CTL, the Q3 output goes high (pin 14), passing through the RESET and PRESET circuits to reset the counter.

C. FWD/REV ROTATION DETECTOR

This section of IC4 enables the Forward or Reverse Masking Gates by changing the state of it's outputs (pins 1 & 2) as necessary.
When the tape is travelling continuosly in either the forward or reverse directions, incoming CTL pulses on pin 4 keep the FF reset, holding pin 1 Low, enabling the FWD Masking Gates. Thus, that section passes waveform 6 (figure 3–17) to Q50 during playback in either direction, as long as no reversals occur.
If the Search dial is used to change the direction of tape travel, a pulse appears on pin 3. (The origin of this pulse will be explained in the next section). This pulse, applied to the clock input of the FF causes it to change states, bringing pin 2 Low, which opens the REV Masking Gates, and passing waveform 9 to Q50. However, when the next CTL arrives, the FF assumes it's previous state.
Therefore, the REV Masking waveform is only used during that brief interval (only during one frame.)

D. FWD/REV SWITCHING PULSE GENERATOR

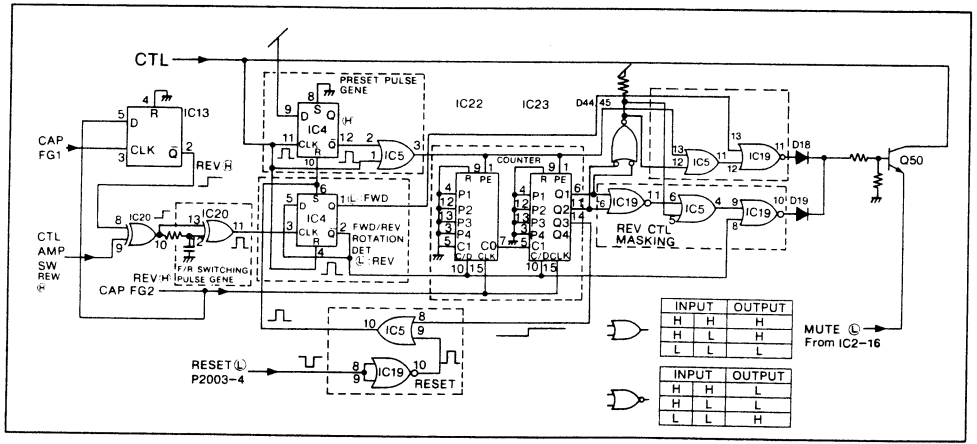
The 2 Capstan FG signals which are 90 degrees out of phase are applied to the clock and data inputs of IC3. This causes pin 2 to be high in the reverse mode, and low in the forward mode. This signal is applied to IC20 pin 8. A "CTL AMP SWITCH REV High" signal is applied to pin 9 of the same IC, which is developed by the Servo Microcomputer IC2, pin 8. When the tape travel direction changes, This pulse is used to clock IC4, as explained previously.

E. RESET

On power–up, the Reset circuit zeroes the counters via the Preset Pulse Generator, and enables the REV Masking gates via the FWD/REV Rotation Detector, until CTL pulses arrive. In addition, a count of 64 produces the same condition, as explained above.

4) Search Playback

This editing machine enables you to search for tape sections easily, using the search dial which enables both shuttle and jog operations.
These operations are performed by using the digital servo, capstain FG signals (multiplied for slow mode,) gain controlled CTL pulse, and CTL masking signal.
In the search mode, only R′ and R″ heads (SS Heads) which are 70um wide each are used to trace the video track.
This choice of the head combination is determined by SS ON H signal (IC2–40).
Capstan control signals in any modes are shown in Figure 3–18 (A) and 3–18 (B), and simplified block diagram as shown in Figure 3–18 (C).

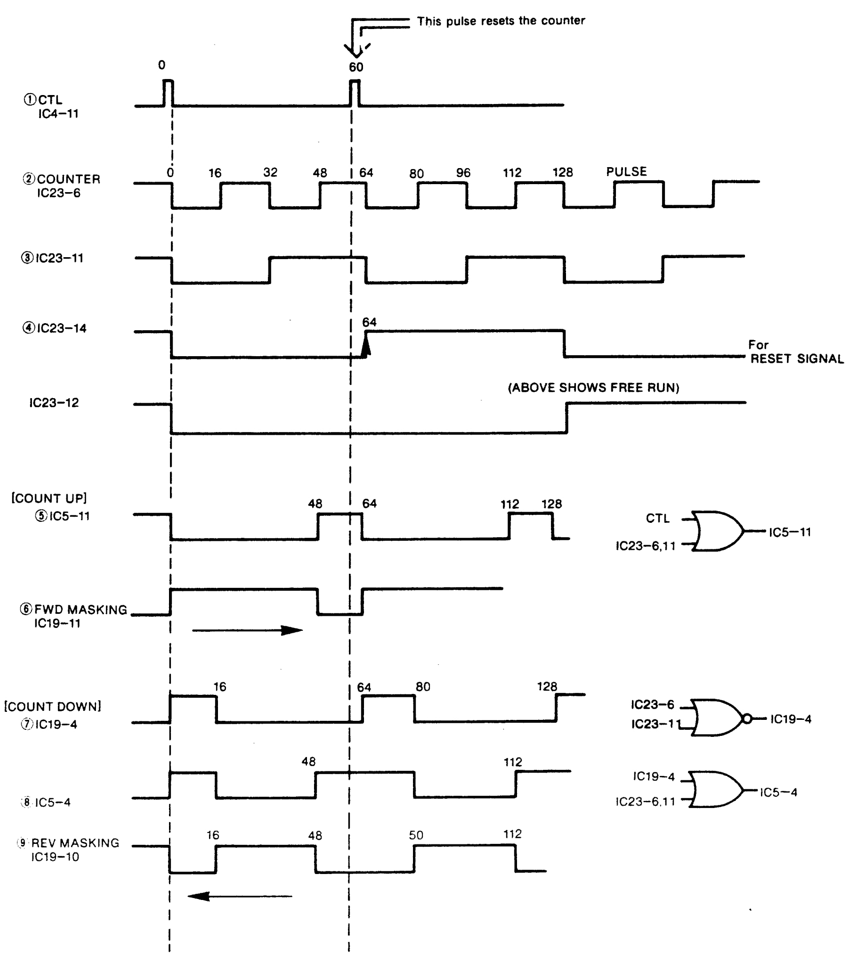

CTL
CAP FG1
IC13
D
R
CLK
Q
REV H
CTL AMP SW REW H
IC20
REV H
CAP FG2
F/R SWITCHING PULSE GENE
PRESET PULSE GENE
IC4
IC5
FWD
FWD/REV ROTATION DET
L: REV
IC22
IC23
COUNTER
D44
IC19
REV CTL MASKING
D18
D19
Q50
RESET L
P2003-4
RESET
MUTE L
From IC2-16

INPUT		OUTPUT
H	H	H
H	L	H
L	L	L

INPUT		OUTPUT
H	H	L
H	L	L
L	L	H

Figure 3–16 CTL Masking

CTL MASKING TIMING(AMOUNT OF PULSE SHOWS CLOCK OF FG SIGNAL)


This pulse resets the counter
0
60
①CTL IC4–11
②COUNTER IC23–6
0 16 32 48 64 80 96 112 128 PULSE
③IC23–11
④IC23–14
64
For RESET SIGNAL
IC23–12
(ABOVE SHOWS FREE RUN)
[COUNT UP] ⑤IC5–11
48 64 112 128
CTL
IC23–6,11
IC5–11
⑥FWD MASKING IC19–11
[COUNT DOWN] ⑦IC19–4
16 64 80 128
IC23–6
IC23–11
IC19–4
⑧IC5–4
48 112
IC19–4
IC23–6.11
IC5–4
⑨REV MASKING IC19–10
16 48 50 112

(Count down circuit is available only during a frame)

Figure 3—17 Timing of CTL Masking

	SEARCH																
	SHUTTLE																
						JOG ※1											
	REV ×10	REV ×6	REV ×2	REV ×1	REV ×1/2	REV ×1/5	REV x1/10	REV x1/25	STILL PAUSE	FWD x1/25	FWD x1/10	FWD ×1/5	FWD ×1/2	FWD ×1	FWD ×2	FWD ×6	FWD ×10
CAP SP3 IC1–40	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H
CAP SP2 IC1–39	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L
CAP SP1 IC1–38, IC2–6	H	H	H	L	L	L	L	L	L	L	L	L	L	L	H	H	H
CAP SPO IC1–37	L	L	L	H	H	H	H	H	L	H	H	H	H	H	L	L	L
CAP SLOW IC1–34	H	H	H	H	H	H	L	L	H	L	L	H	H	H	H	H	H
CAP ON IC1–33	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H
1/10 IC1–32	L	L	L	L	L	L	H	L	L	L	H	L	L	L	L	L	L
1/25 IC1–31	L	L	L	L	L	L	L	H	L	H	L	L	L	L	L	L	L
1/5~1/25 IC1–30,IC2–36	L	L	L	L	L	H	H	H	L	H	H	H	L	L	L	L	L
×10 ×1/5 IC1–29	H	H	H	H	H	H	L	L	L	L	L	H	H	H	H	H	H
×1/2~×1/25 IC1–28	H	H	H	H	L	L	L	L	H	L	L	L	L	H	H	H	H
PAUSE IC1–26	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L
1/5 IC2–38	L	L	L	L	L	H	L	L	L	L	L	H	L	L	L	L	L
–1~STILL~1/2 IC2–35	L	L	L	H	H	H	H	H	H	H	H	H	H	L	L	L	L
CAP 6.10.REV IC2–28	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
CAP 6.10.FWD IC2–27	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	L
CAP GAIN C IC2–26	L	L	H	L	L	L	L	L	L	L	L	L	L	L	H	L	L
CAP GAIN B IC2–25	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	H	H

※1 Combination with a specific speed and still is possible in the JOG mode.

Figure 3–18 (A) Capstan Control

	R/P(ASSY)	REV×10~REV×2	REV×1~STILL~FWD×2	FWD×6, ×10
R/P CTL IC1–25	L	H	H	H
FWD 1 IC2–30	H	L	H	L
PICH CTL IC2–4	H	H	L	H

Figure 3–18 (B) Capstan Control

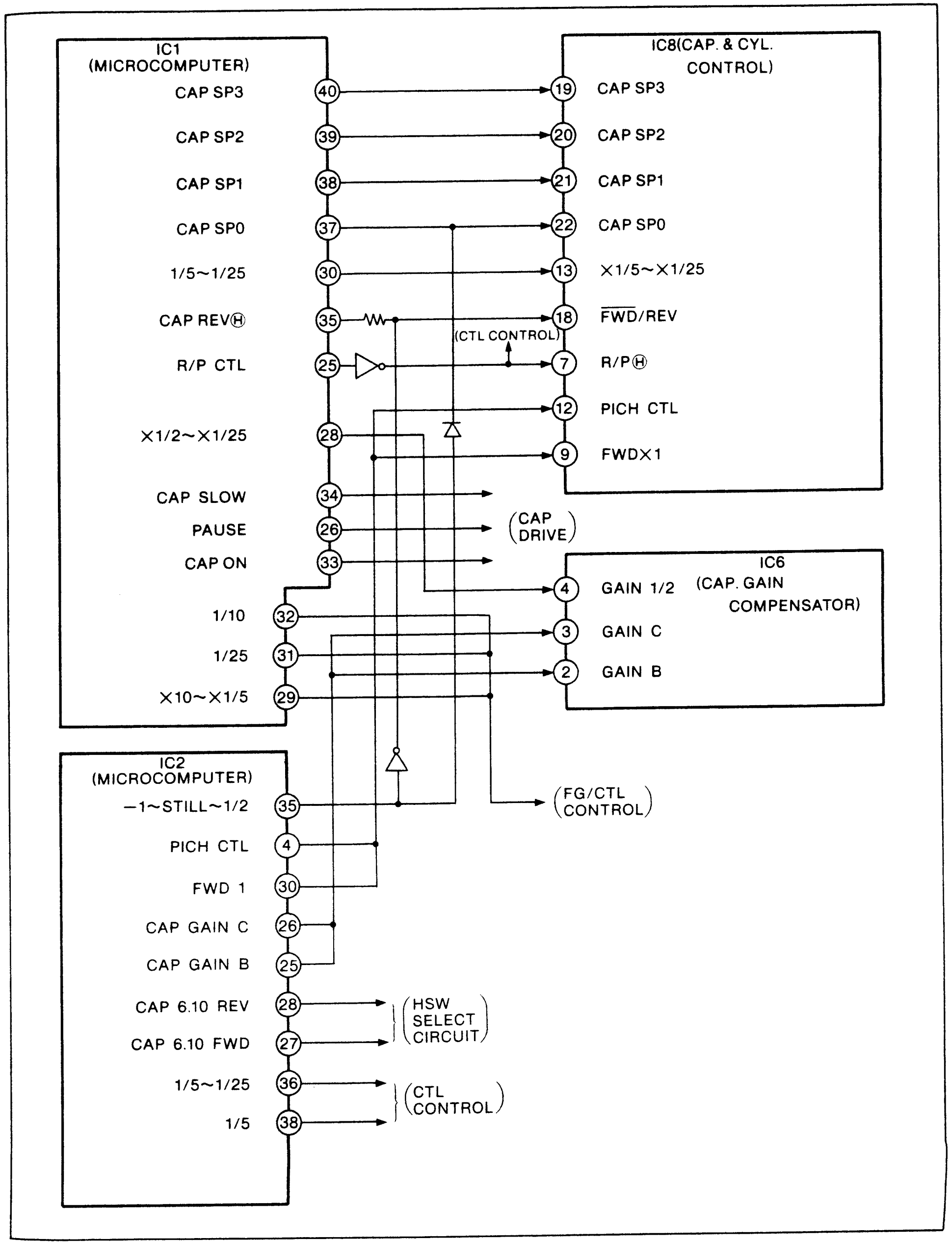

IC1
(MICROCOMPUTER)
CAP SP3
CAP SP2
CAP SP1
CAP SP0
1/5~1/25
CAP REVⒽ
R/P CTL
×1/2~×1/25
CAP SLOW
PAUSE
CAP ON
1/10
1/25
×10~×1/5
40
39
38
37
30
35
25
28
34
26
33
32
31
29
IC8(CAP. & CYL. CONTROL)
19
20
21
22
13
18
7
12
9
CAP SP3
CAP SP2
CAP SP1
CAP SP0
×1/5~×1/25
FWD/REV
(CTL CONTROL)
R/PⒽ
PICH CTL
FWD×1
(CAP DRIVE)
IC6
(CAP. GAIN COMPENSATOR)
4
3
2
GAIN 1/2
GAIN C
GAIN B
(FG/CTL CONTROL)
IC2
(MICROCOMPUTER)
–1~STILL~1/2
PICH CTL
FWD 1
CAP GAIN C
CAP GAIN B
CAP 6.10 REV
CAP 6.10 FWD
1/5~1/25
1/5
35
4
30
26
25
28
27
36
38
(HSW SELECT CIRCUIT)
(CTL CONTROL)

Figure 3–18 (C) Search Control Block Diagram

A. Shuttle

In the shuttle mode, there are 17 speed modes, that is to say, Rev X10, Rev X6, Rev X2, Rev X1, Rev X1/2, Rev X1/5, Rev X1/10, Rev X1/25, STILL, FWD X1/25, FWD X1/10, FWD X1/5, FWD X1/2, FWD X1, FWD X2, FWD X6, FWD X10.
The Capstan motor is controlled in all the above modes by using many signals from micro computers IC1 and IC2, as shown in Figure 3–18.
For example, in the FWD X1/25 mode, CAP SPO (IC1–37), CAP SLOW (IC1–34), CAP ON (IC1–33), 1/25 (IC1–31) and (1/5~1/25)(IC1–30) signals are activated.
CAP SPO and (1/5~1/25) signals are fed to the digital servo, IC8 and the value of the preset pulse is selected. The 1/25 signal is used to choose. The proper multiple of FG frequency, generated by the servo, as well as the proper CTL amp gain.

B. Jog

Another function of the Capstan Speed Servo is a jog mode which simulates direct control of the capstan.
The control of the capstan motor in the JOG mode is the same as in the SHUTTLE mode.
When the search dial on the front panel is turned quickly, the velocity of the capstan motor corresponding to the speed of the dial, controlled by the signals from IC1 and IC2.
The only difference is the condition during the slow rotation of the search dial.
When the dial is turned slowly, the capstan motor rotates not continuously but intermittently, namely, this rotation shows the combination of X1/25 speed and pause. This capstan speed is decided by the rotating speed of the search dial. Please refer to System Control Section in detail.
Also, there are two ways to operate the search dial in the JOG mode. One is to operate the dial on the front panel, the other is on the editing controller, AG–A650.
To operate the dial on the front panel enables X1/25, X1/10, and X1/5 JOG modes, but the operation on the editing controller enables X1/25 through X1 modes to contract the search time.

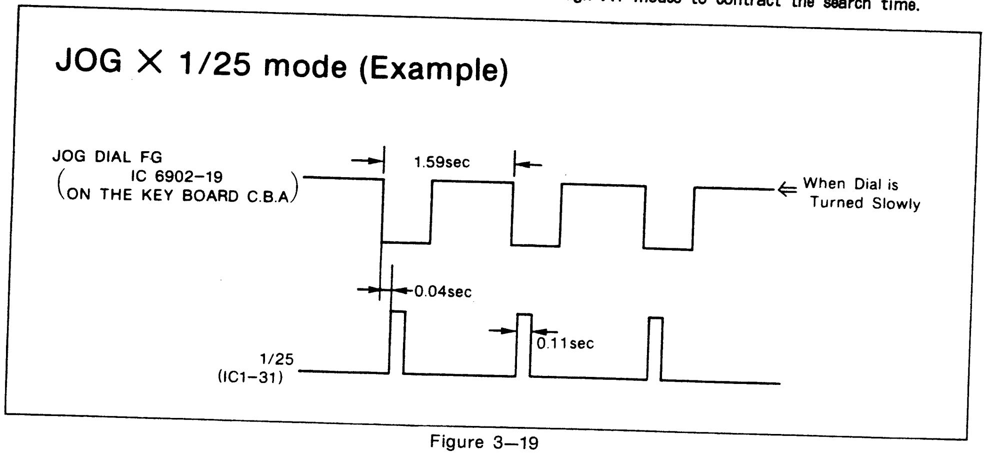

JOG X 1/25 mode (Example)
JOG DIAL FG
(IC 6902–19 ON THE KEY BOARD C.B.A)
1.59sec
When Dial is Turned Slowly
0.04sec
0.11sec
1/25 (IC1–31)

Figure 3–19

CYCLE AT PIN 19 OF IC2	CAPSTAN SPEED
MORE THAN 121 msec	X1/25 INTERMITTENT PULSE DRIVE
42msec~120msec	X1/25
15msec~41msec	X1/10
LESS THAN 14msec	X1/5

Figure 3–20 JOG

5) Head Switching Select circuit

The head switching signal produced from the Cylinder PG signal is sent to the Head Amp circuit to switch the heads, R and L, or R' and R". The following 3 kinds of head switching signals are needed:

A. R/P Head Switching signal
In the record mode, this signal is selected in IC36.

B. 1/2V signal
This signal is selected in the STOP (E–E) mode, to be used in the Chrominance circuit.

C. SS Head Switching signal
Head switching signal from cylinder PG is delayed for 5.4msec. (1/3 V) by IC20, 33, 35, in the search mode. (Except X1 search mode.)

In the search mode, SS heads (70 um) are used to get a cleaner picture, but since these heads are 60 degrees apart from the normal heads the head switching timing is delayed accordingly. (60 degrees as 6.66 msec at 1500 rpm)
Also, an artificial V sync signal is generated by using, the SS head switching signal in IC20 and 33, which is then sent to the Video circuit.

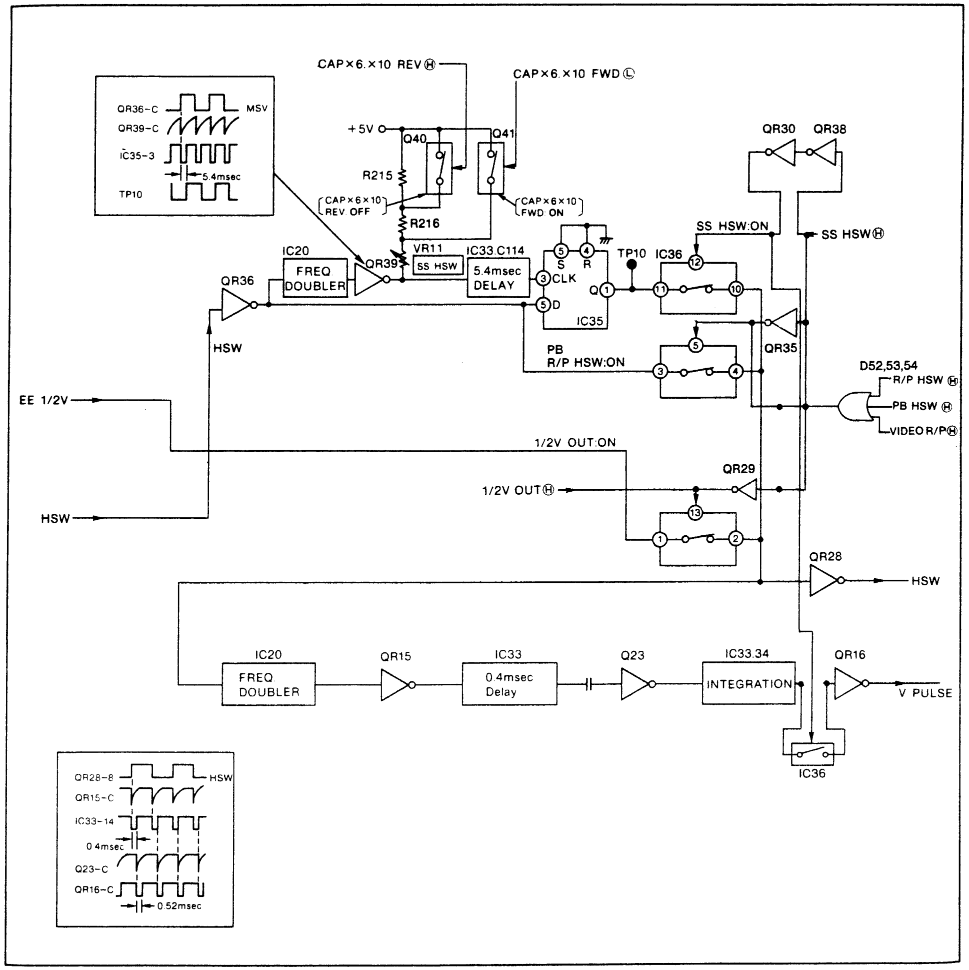

QR36-C
MSV
QR39-C
IC35-3
5.4msec
TP10
CAP×6.×10 REV Ⓗ
CAP×6.×10 FWD Ⓛ
+5V
Q40
Q41
R215
CAP×6×10 REV OFF
CAP×6×10 FWD ON
R216
VR11
SS HSW
IC33.C114
5.4msec DELAY
IC20
FREQ DOUBLER
QR39
QR36
HSW
S
R
CLK
Q
D
IC35
TP10
IC36
SS HSW:ON
SS HSW Ⓗ
QR30
QR38
QR35
PB
R/P HSW:ON
D52,53,54
R/P HSW Ⓗ
PB HSW Ⓗ
VIDEO R/P Ⓗ
EE 1/2V
1/2V OUT:ON
1/2V OUT Ⓗ
QR29
HSW
QR28
HSW
IC20
FREQ DOUBLER
QR15
IC33
0.4msec Delay
Q23
IC33.34
INTEGRATION
QR16
V PULSE
IC36
QR28-8
HSW
QR15-C
IC33-14
0.4msec
Q23-C
QR16-C
0.52msec

Figure 3–21 HSW Select

3-2. SERVO (2) (FRAMING) CIRCUIT (REF. NO. 2000 SERIES)

GENERAL DESCRIPTION

When the playback vertical sync of a prerecorded tape and the vertical sync of the to-be-edited program source are in phase, editing can be done without any vertical disturbance on the TV monitor.

However, the horizontal sync may be dis-continuous at the edit point, which will cause horizontal flagging. The probability of this disturbance occurring at the edit point is 50/50 with random vertical servo lock of video signals which are interlaced 2:1. This disturbance is caused by the mis-alignment of field one and field two which differ by 1/2 a horizontal line.

To achieve interlace, the 625-line Frame is divided into two 312.5-line fields, and the vertical sync interval is divided into 1/2H (horizontal line timing) segments. These serve to keep the horizontal sweep of the monitor in continuous synchronization. The two fields which make up a frame are called, variously, field one and field two. For this discussion, field one is that field which begins with one full H line, and field two is that field which begins with a 1/2H line. In order to have stable horizontal sweep, the fields must come in sequence, and editing should only be performed between frames.

If editing is performed joining two like fields (two field ones or two field twos), there will be a half H error in the Horizontal sync, and the monitor will exhibit flagging until H locking is reachieved.

To prevent horizontal disturbance at the edit points, it is necessary to detect the difference between the fields, called "frame detection", and then force the servo to synchronize the vertical intervals of the two video signals.

When the FRAME SERVO switch is on, the edit point is always chosen at the start of the field one ("frame editing").

Frame editing is accomplished by making the servo circuits lock so that the video playback of the tape into which material will be edited is in frame alignment with the input video, often called the source signal. This requires that the servo of the recorder, called the editor, shift the playback, since the control of the source sync signal may not be accessible (camera, off-air, etc). This is an important job of the recorder (editor), to shift its playback in order to be in frame alignment with the player (source).

Once this frame alignment is achieved, the servo will hold the signals in lock.

If the unit is going to just record without regard to any existing signal (using a blank tape) the unit must align the heads and sync in a consistent pattern.

Though coincidence of frame between playback and incoming video signals is performed in the Frame Detection circuit, H phase also can be automatically adjusted in the Auto H Phase circuit to prevent the video signals to be recorded from misaligning with the H lines on the tape.

In this Editing VCR, the head switching signal will be high for the field one, and low for the field two.

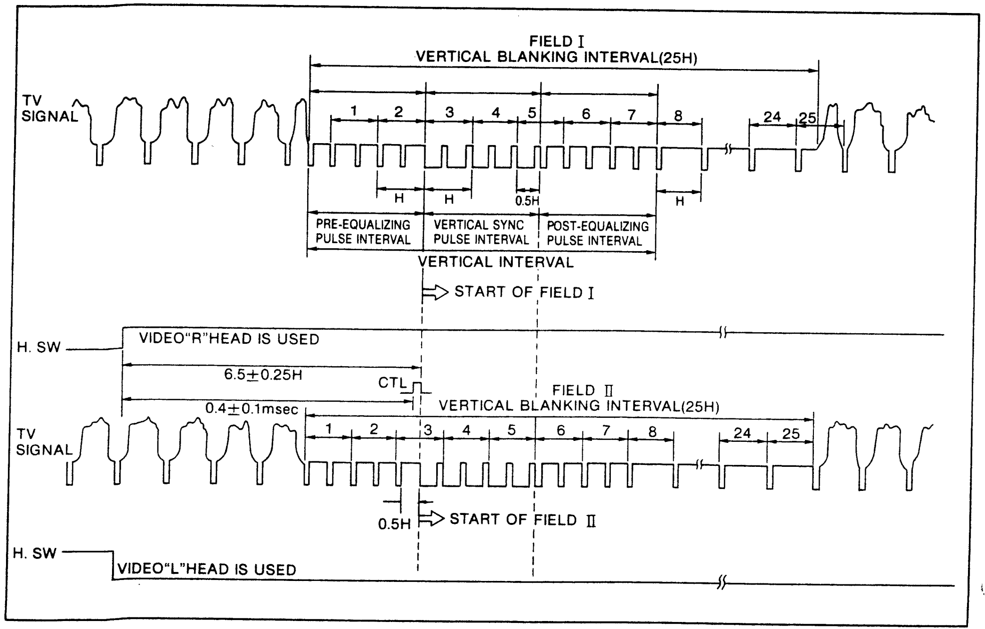

FIELD I
VERTICAL BLANKING INTERVAL(25H)
TV SIGNAL
1
2
3
4
5
6
7
8
24
25
H
H
0.5H
H
PRE-EQUALIZING PULSE INTERVAL
VERTICAL SYNC PULSE INTERVAL
POST-EQUALIZING PULSE INTERVAL
VERTICAL INTERVAL
START OF FIELD I
H. SW
VIDEO"R"HEAD IS USED
6.5±0.25H
CTL
0.4±0.1msec
FIELD II
VERTICAL BLANKING INTERVAL(25H)
TV SIGNAL
1
2
3
4
5
6
7
8
24
25
0.5H
START OF FIELD II
H. SW
VIDEO"L"HEAD IS USED

Figure 3—22 TV SIGNAL

The overall block diagram of the Servo (2) (Framing) circuit is shown in Figure 3-23.

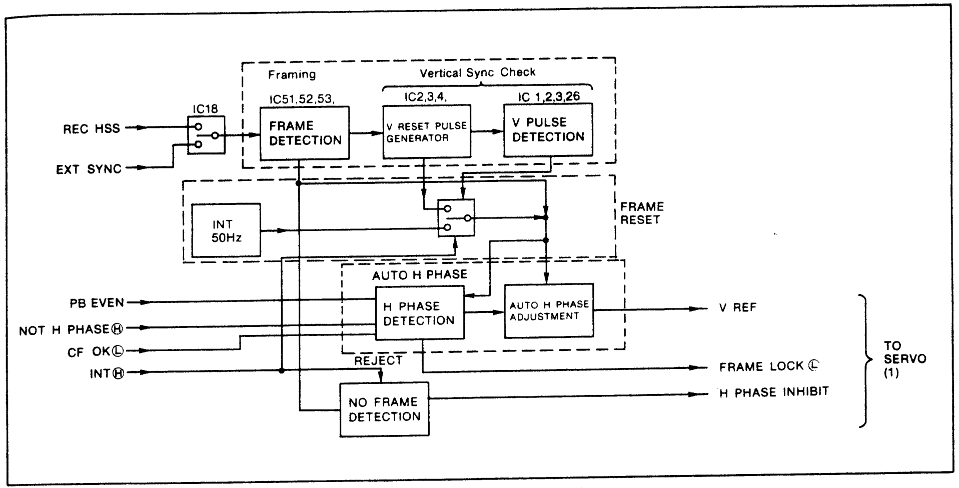

Framing
Vertical Sync Check
IC51.52.53.
IC2,3,4.
IC 1,2,3,26
IC18
REC HSS
EXT SYNC
FRAME DETECTION
V RESET PULSE GENERATOR
V PULSE DETECTION
INT 50Hz
FRAME RESET
AUTO H PHASE
PB EVEN
NOT H PHASE(H)
CF OK(L)
INT(H)
H PHASE DETECTION
AUTO H PHASE ADJUSTMENT
REJECT
NO FRAME DETECTION
V REF
FRAME LOCK (L)
H PHASE INHIBIT
TO SERVO (1)

Figure 3-23 Servo (2). (Framing) Circuit

CIRCUIT DESCRIPTION

1) FRAMING CIRCUIT (SERVO 2 REF. No200 SARIES)

The Frame detection pulse developed by this circuit is used to reset the V sync-derived 25Hz signal at the beginning of field 1, as well as being used by the V pulse detector to detect proper V Sync timing.

The Framing circuit consists of three major sections as shown in Figure 3-23.

A. Frame Detection Circuit
B. Vertical Sync Check Circuit
C. Auto H Phase Circuit

A. Frame Detection Circuit

In this circuit, V sync and the Frame Detection signal are extracted by using incoming composite signal or external sync signal from the rear jack.

The overall diagram of this circuit is shown in Figure 3-24.

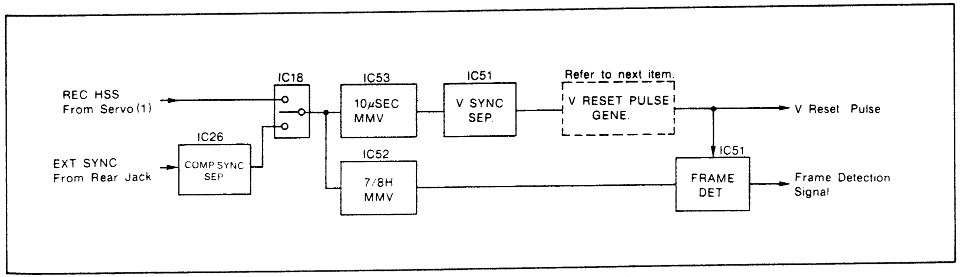

REC HSS From Servo (1)
EXT SYNC From Rear Jack
IC18
IC26
COMP SYNC SEP
IC53
10μSEC MMV
IC52
7/8H MMV
IC51
V SYNC SEP
Refer to next item.
V RESET PULSE GENE.
IC51
FRAME DET
V Reset Pulse
Frame Detection Signal

Figure 3-24 Frame Detection Circuit

Composite Sync Separator

The incoming external sync signal passes through the clamp circuit consisting of D54, R238, and C121, and R238, C121 and enters the H sync separator, IC26 D55 is a temperature compensator.

The external sync signal is fed to the sync selector, IC18, Pin 12, and the incoming composite sync signal is fed to the other input of the selector, Pin 13. Either the input sync signal or the external sync signal is selected by the EXT L signal from the SYNC SELECTOR on the front panel.

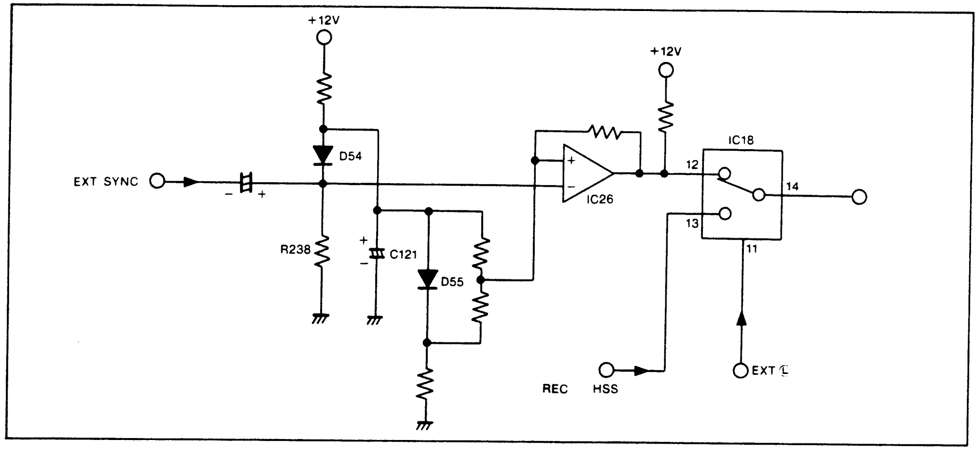


Figure 3−25 Composite Sync Separator

Microsecond Multivibrator

In order to provide a trigger for the flip flop which follows the sync separator, a short duration multivibrator (10usec) is used. This is made up of a differentiator, a transistor and RC sawtooth generator, and an operational amplifier (OP AMP).
The H sync signal is differentiated by C51 and D51, then turns Q51 alternately on. The switching action discharges C52. Due to the time constant of C52 and R53 the charge curve is as shown in Figure 3−26.
The rising edge of the 10usec MMV signal clocks the composite sync signal through the D−type flip flop IC51 which separates the vertical sync signal from the composite sync signal. (See Figure 3−29 waveforms 2,3,4)

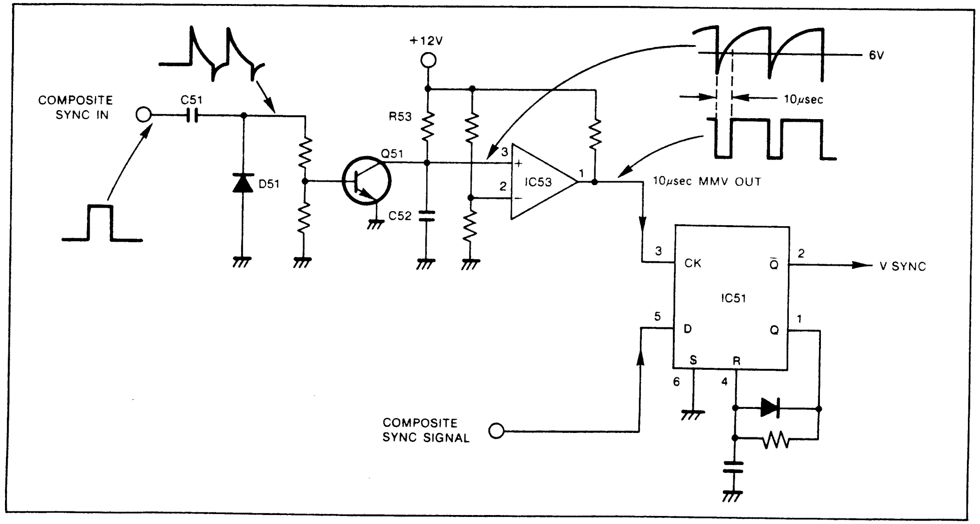


Figure 3-26 Microsecond Multivibrator

Frame Detector

Please refer to Figure 3−29 (A) for waveforms the frame detector (source side) consists of a 7/8H monostable multivibrator and a D−type flip flop. The composite sync signal triggers the 7/8H MMV on pin 5, and the MMV signal is supplied to Pin 9 of IC51 through D55. The composite sync signal is also fed to Pin 9 through R61.

(D55 and R61 form an AND gate.) When the MMV output is low, the composite sync is inhibited because the D input is held low (see IC51−9 waveform 6, figure 3−29(A)).
The V Reset pulse on pin 11, derived from the 10 usec MMV, clocks this sync−derived waveform on pin9, producing the Frame Detect signal on pin 13 and 12.

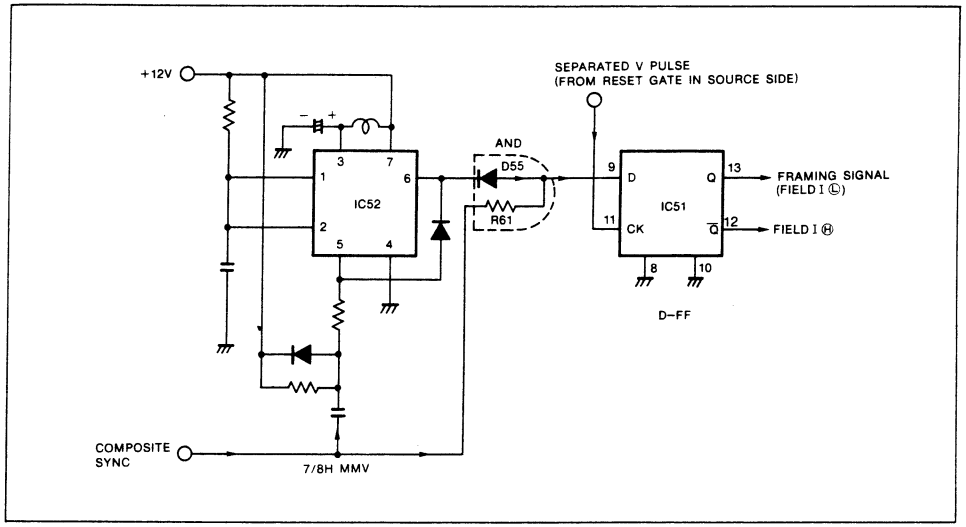


Figure 3−27 Frame Detector

B. Vertical Sync Check Circuit

If the sync timing from the incoming video or the external source is non−standard, (as in the shuttle mode), it should not be used to develop the frame reference signal. The Sync Check circuit detects this condition by generating a timing interval or "window", and passing V−sync signals which arrive within this window. V−sync signals outside this range (+/− 3%) are rejected. Refer to figure 3−29 for the timing of the circuits.

V Reset Pulse Generator Section

The separated V sync signal from the source side IC51−2 is differentiated by C2 and R4, inverted by IC4, and sent to the Reject Gate and Reject Memory. If the incoming V sync falls within the limits allowed (20msec − 3%), by the V Pulse Detector section, it passes through the Reject Gate, which was enabled by a High signal from pin 10 of IC3, set by a count of 648 from the counter. This V sync pulse is inverted, resets the counter and Reject memory, and is sent to the Frame Detector, IC51.

V Pulse Detection Section

A 32,768KHz clock pulse is generated by IC4 and crystal X1. This signal is sent to pin 10 of IC1, which is a 12 stage binary ripple counter with discrete outputs (Q1 thru Q12). Counter outputs Q3, Q5, and Q10 are NAND−Gated and fed to the V Interval Memory IC2 pin1, and the Reject Memory IC3 pin 11. The NAND Gate output goes low when the counter reaches 648 (after 19.5 msec), which causes IC3 pin 10 to go High, opening the Reject Gate to allow V sync to pass if present. If V sync now arrives (within the window), it is sent to the Frame Detector, and resets the counter on pin 11, and the Reject Memory on pin 8. The count starts again from zero. As long as V sync arrives between counts 648 and 672 (19.5 to 20.5 msec), this sequance repeats.
Counter outputs Q6, Q8 & Q10 are also NAND Gated, producing a pulse at count 672, the upper timing limit of the window. pins 6 & 9 of IC3 are the SET and RESET inputs to the V Interval Memory FF IC2. If the counter reaches 672 without being reset, due to improper timing of incoming V sync, the FF output goes Low, as shown in figure 3−28. A pulse train appears on pin 3 for several cycles of IC1, which is integrated by R12 and C14 and sent to IC26. This comparator, whose threshold is set at 6V, goes low when irregular V sync is present. QR14 inverts this level, and drives the Sync Selector IC18 to the internal (INT) position.
The Internal mode is selected when the V sync is irregular. If the switch is in the EXT mode, and incoming V sync is irregular, the EXT mode is maintained, although Servo lock will not occur.

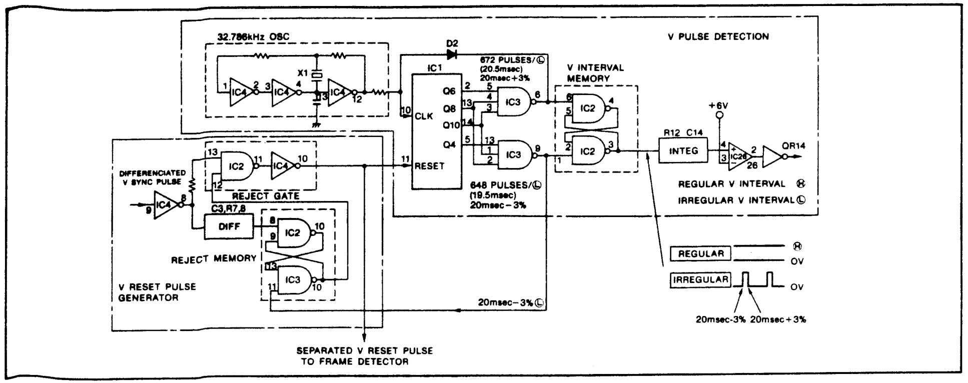

32.768kHz OSC
V PULSE DETECTION
D2
IC1
IC4
X1
672 PULSES/Ⓛ
(20.5msec)
20msec+3%
648 PULSES/Ⓛ
(19.5msec)
20msec−3%
V INTERVAL MEMORY
IC2
IC3
CLK
RESET
Q6
Q8
Q10
Q4
+6V
R12 C14
INTEG
IC26
QR14
REGULAR V INTERVAL Ⓗ
IRREGULAR V INTERVAL Ⓛ
DIFFERENCIATED V SYNC PULSE
REJECT GATE
C3,R7,8
DIFF
REJECT MEMORY
V RESET PULSE GENERATOR
20msec−3%Ⓛ
REGULAR
IRREGULAR
OV
20msec-3% 20msec+3%
SEPARATED V RESET PULSE TO FRAME DETECTOR

Figure 3–28 "Vertical Sync Check" Circuit

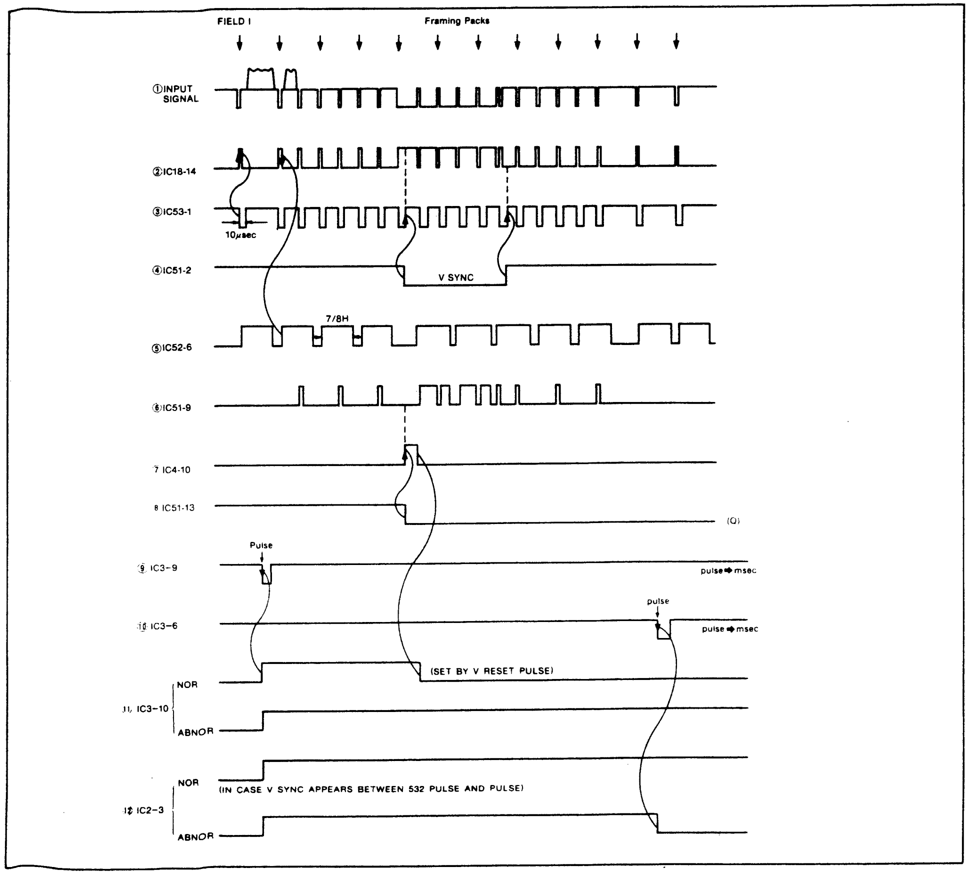


Figure 3–29 Framing

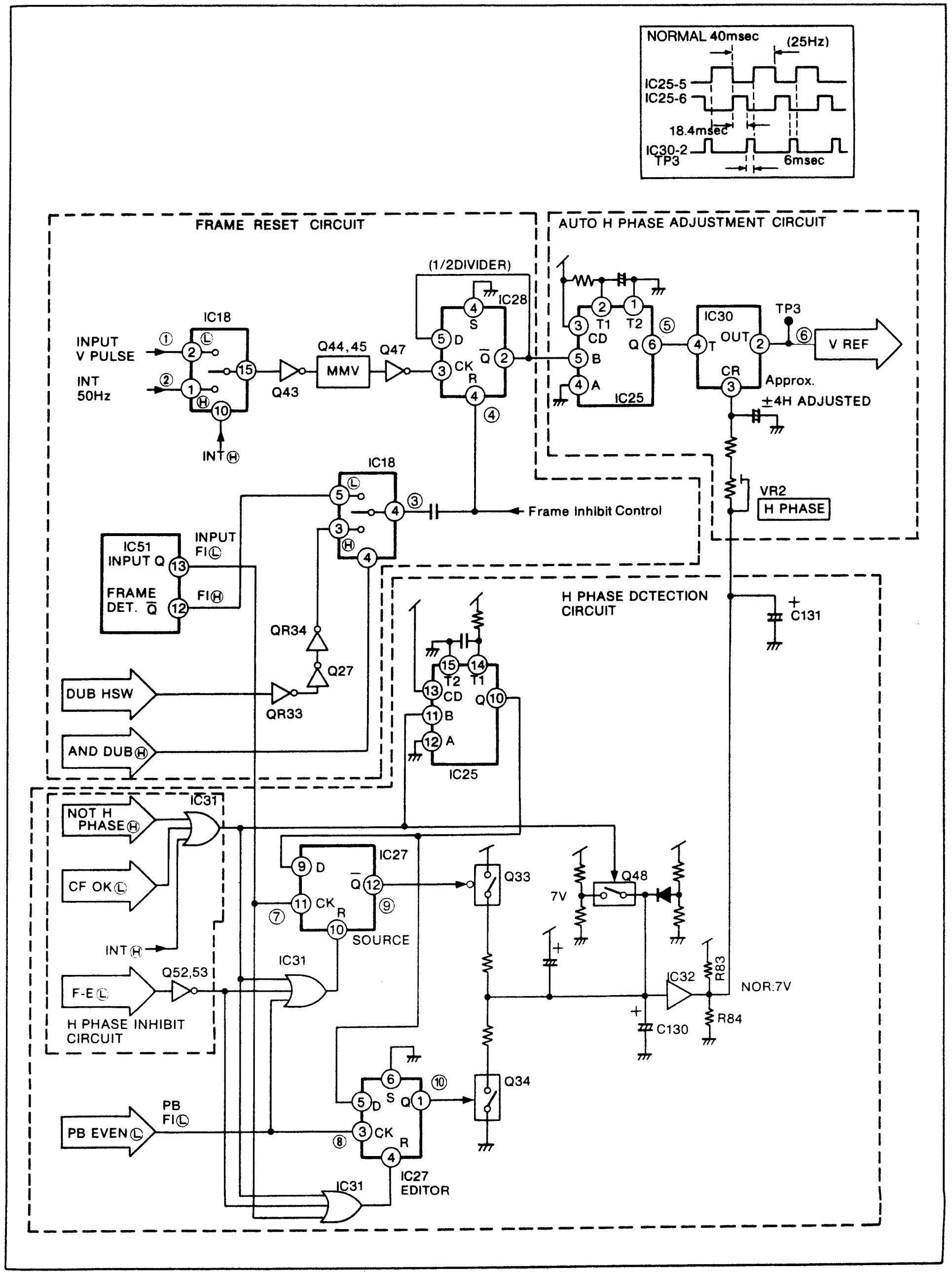

NORMAL 40msec
(25Hz)
IC25-5
IC25-6
18.4msec
IC30-2
TP3
6msec
FRAME RESET CIRCUIT
AUTO H PHASE ADJUSTMENT CIRCUIT
(1/2DIVIDER)
IC28
IC18
INPUT V PULSE
INT 50Hz
INTⒽ
Q43
Q44,45
MMV
Q47
IC25
IC30
TP3
V REF
Approx. ±4H ADJUSTED
VR2
H PHASE
Frame Inhibit Control
IC51 INPUT Q
FRAME DET. Q̄
INPUT FIⓁ
FIⒽ
QR34
Q27
QR33
DUB HSW
AND DUBⒽ
H PHASE DCTECTION CIRCUIT
C131
NOT H PHASEⒽ
CF OKⓁ
IC31
IC27
SOURCE
Q33
Q48
7V
INTⒽ
Q52,53
F-EⓁ
H PHASE INHIBIT CIRCUIT
IC32
R83
NOR:7V
C130
R84
Q34
PB EVENⓁ
PB FIⓁ
IC27 EDITOR

Figure 3–30 Auto H Phase

2) Auto H Phase circuit

When editing is performed, framing is detected in the frame detection circuit as is referred to in framing circuit but H phase between incoming sync and playback sync signals might not synchronize at the editing point. This causes an H sync disturbance due to mis–alignment of the H sync between original tape and the new video.

To prevent this, the H phase difference between the two signals is detected in the H Phase Detection circuit and is converted to a certain DC voltage, which determines the timing of the V reference signal for servo control. This is performed in the Auto H Phase Adjustment circuit. Please refer to figure 3–23.
The diagram and the timing of this circuit are shown in Figure 3–30 and 3–31(A)/(B).

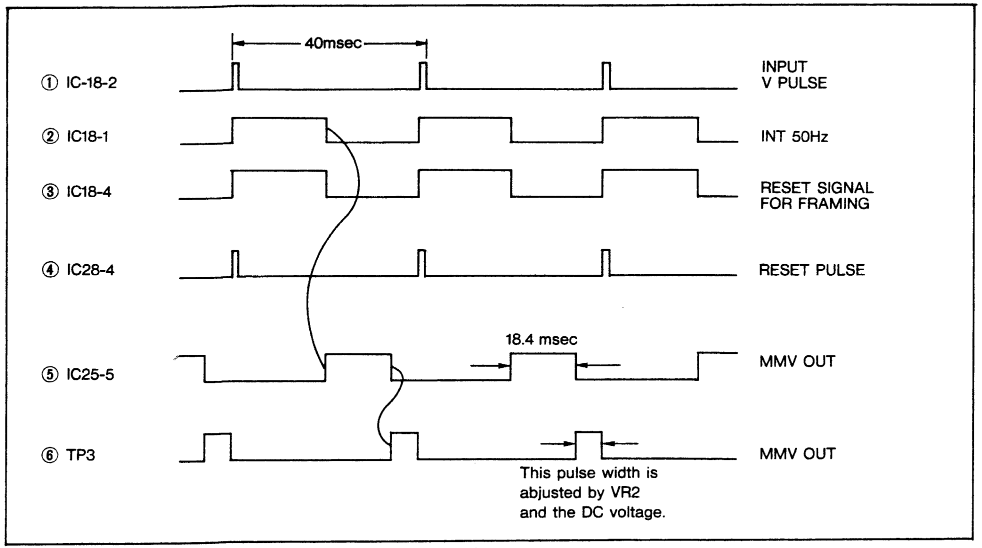

40msec
① IC-18-2
② IC18-1
③ IC18-4
④ IC28-4
⑤ IC25-5
⑥ TP3
INPUT
V PULSE
INT 50Hz
RESET SIGNAL
FOR FRAMING
RESET PULSE
18.4 msec
MMV OUT
MMV OUT
This pulse width is
abjusted by VR2
and the DC voltage.

Figure 3–31 (A) Auto H Phase Timing.

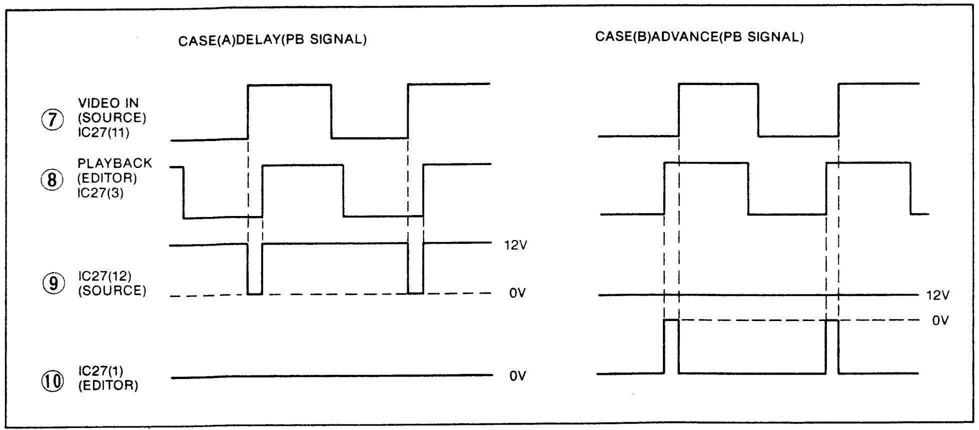

CASE(A)DELAY(PB SIGNAL)
CASE(B)ADVANCE(PB SIGNAL)
⑦ VIDEO IN (SOURCE) IC27(11)
⑧ PLAYBACK (EDITOR) IC27(3)
⑨ IC27(12) (SOURCE)
⑩ IC27(1) (EDITOR)
12V
0V
12V
0V
0V

Figure 3–31(B) H Phase Detection

A. Frame Reset Circuit

V pulse from the input (source) signal or internal 50Hz signal is selected in IC18 and this signal is divided by two to make 25Hz resetting using framing signal if there is no frame inhibit signal.
There are two signals used to reset in each frame.
One is framing signal from the input signal (VIDEO IN) in the line mode. The other is framing signal (HSW) from the Dubbing cable in the dub mode.
Frame locked signal from IC28 is next sent to the Auto H Phase Adjustment circuit.

B. Auto H Phase Adjustment

25Hz signal from IC28 is sent to IC25 (MMV) and delayed by 18.4 msec. This delayed signal is sent to IC30 (MMV) whose time constant is adjustable by VR2 and the DC voltage from IC32.
The H phase detect signal is integrated by C130 and C131 into a DC voltage, which is used to decide the time constant with VR2, C66 and R99. This voltage is fixed to 6V during the H phase inhibit period.

C. H Phase Detection

Since the flip flop is triggered on the rising (positive going) edge of the clock input, but the reset or clear is active high and will inhibit any change of state while high, the two cross connected (IC31) flip flops only respond to clock leading phase difference.
Figure 3–31 (B) shows the two conditions that can occur other than exact phase match.
Using both framing siganls, H phase between input and playback signal is detected.
The major components of the H phase servo are two D–type flip flops, three transistor switches and an op amp "emitter follower". The video input framing signal is fed to IC27, Pin 11 and to Pin 4 through IC31. The playback framing signal is fed to Pin 3 of IC27 and to Pin 10 through IC31.
If the source side is advanced (Case (A)), Low pulses are fed to turn on Q33 from Pin 12 of IC27, and voltage is supplied to C130 to charge it. The voltage is buffered by IC32 and mixed with the 7V DC produced by R83 and R84, then the mixed signal (a slightly higher voltage) is sent to the auto H phase adjustment circuit.
If the editor side is advanced (Case (B)), High pulses are fed to turn on Q34 from Pin 1 on IC16, and C130 is discharged. The voltage is buffered by IC32 and mixed with the 7V DC, and then the slightly lower signal to the servo circuit. The H servo signal, which varies approximately +– 4H around Centre position,is used to slightly vary the cylinder motor speed.
When H phase inhibit is High, the high signal is fed to both sections of IC27 through IC31, which resets and inhibits both flip flops. The same high signal is also supplied to the base of Q48 and the H servo voltage is fixed at 7V DC until frame lock is achieved.
If the unit is placed in the Record mode, the E–E Low signal is inverted by Q52 and Q53 and the resulting High signal is supplied to Pins 4 and 10 of IC27 through IC31 which resets both D–FFs. In this case, the voltage at C130 slowly returns to 7V DC.

3) Frame Lock (See figure 3–32)

The frame–detected signal for input in IC51 is fed to Q32 and playback framing signal is supplied from the colour framing circuit, mixed by diodes D47 and D65 and finally the error signal is fed to Q32. If there is not frame–locked, Q32 if turned ON and High signal is fed out from the frame lock circuit as not–frame locked signal.

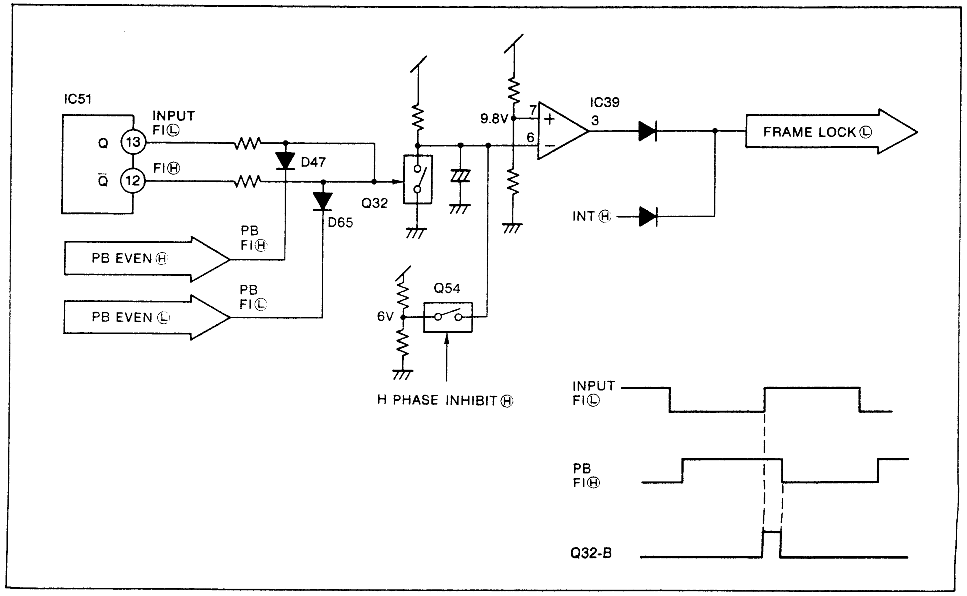

IC51
Q
Q̄
13
12
INPUT FIⓁ
FIⒽ
D47
D65
Q32
PB EVEN Ⓗ
PB EVEN Ⓛ
PB FIⒽ
PB FIⓁ
9.8V
7
6
3
IC39
FRAME LOCK Ⓛ
INT Ⓗ
Q54
6V
H PHASE INHIBIT Ⓗ
INPUT FIⓁ
PB FIⒽ
Q32-B

Figure 3—32 Frame Lock

4) NO Frame Detection circuit

If there is no incoming sync signal from the source side (ex. still mode), it will be impossible to detect the start of each frame.
In this case, the cylinder phase servo should be fixed to prevent it from being disturbed.

Also, as there is no frame detection signal (namely, no incoming composite signal), H phase detection should not be performed.
Therefore, H Phase Inhibit signal is produced after approximate 16msec. by this circuit when no framing signal is detected. The block diagram is shown in Figure 3-33.

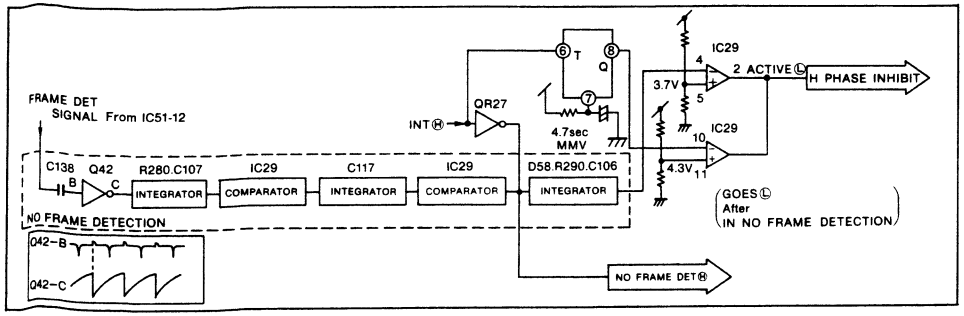

FRAME DET
SIGNAL From IC51-12
C138
Q42
B
C
R280.C107
INTEGRATOR
IC29
COMPARATOR
C117
INTEGRATOR
IC29
COMPARATOR
D58.R290.C106
INTEGRATOR
NO FRAME DETECTION
Q42-B
Q42-C
INT Ⓗ
QR27
6
T
8
Q
7
4.7sec
MMV
3.7V
4
5
IC29
2 ACTIVE Ⓛ
H PHASE INHIBIT
IC29
10
11
4.3V
(GOES Ⓛ
After
IN NO FRAME DETECTION)
NO FRAME DET Ⓗ

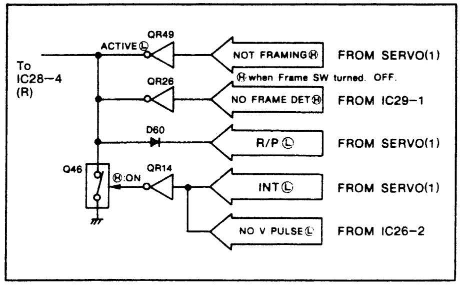
Figure 3—33 No Frame Detection

5) Framing Inhibit Control circuit

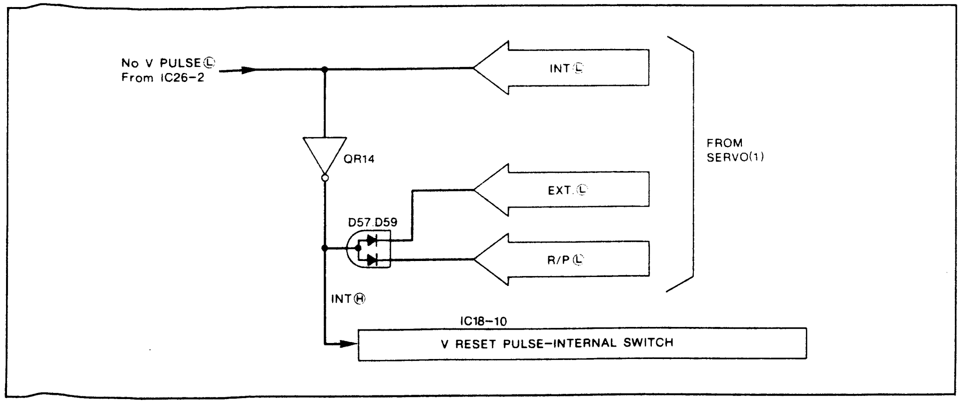
The Frame detection signal is inhibited from resetting the 1/2 divided V pulse when the following signals appear : NOT FRAMING H (when Frame SW is turned OFF on the panel), NO FRAME DET H (from NO Frame Detection circuit), R/P L, INT L, NO V PULSE L (from V Pulse Detection circuit).

6) Internal Switching circuit

Either internal 50Hz the V reset pulse from incoming video or external sync are selected by IC18. This control is performed by the signals which follow : NO V PULSE L (from V Pulse Detection circuit), INT L, EXT L, R/P L. When INTERNAL is selected by INT L or NO V PULSE L, the switch IC18 selects the internal 50Hz. But in R/P or EXT mode, the internal 50Hz signal is inhibited.


To
IC28—4
(R)
ACTIVE Ⓛ
QR49
NOT FRAMING Ⓗ
FROM SERVO(1)
Ⓗ when Frame SW turned. OFF.
QR26
NO FRAME DET Ⓗ
FROM IC29—1
D60
R/P Ⓛ
FROM SERVO(1)
Q46
Ⓗ:ON
QR14
INT Ⓛ
FROM SERVO(1)
NO V PULSE Ⓛ
FROM IC26—2

Figuer 3— 34 Framing Inhibit Control


No V PULSE Ⓛ
From IC26—2
INT Ⓛ
QR14
EXT Ⓛ
D57.D59
R/P Ⓛ
FROM
SERVO(1)
INT Ⓗ
IC18—10
V RESET PULSE—INTERNAL SWITCH

Figuer 3—35 Internal Switching

3-3. COLOUR FRAMING CIRCUIT
(REF. NO. 2500 SERIES)

GENERAL DESCRIPTION

This AG—6500 equips not only framing servo but also colour framing servo.
In the PAL system, a frame is composed of two fields but the continuity of the burst signals is kept as one cycle which consists of four fields as shown in figure 3—36.

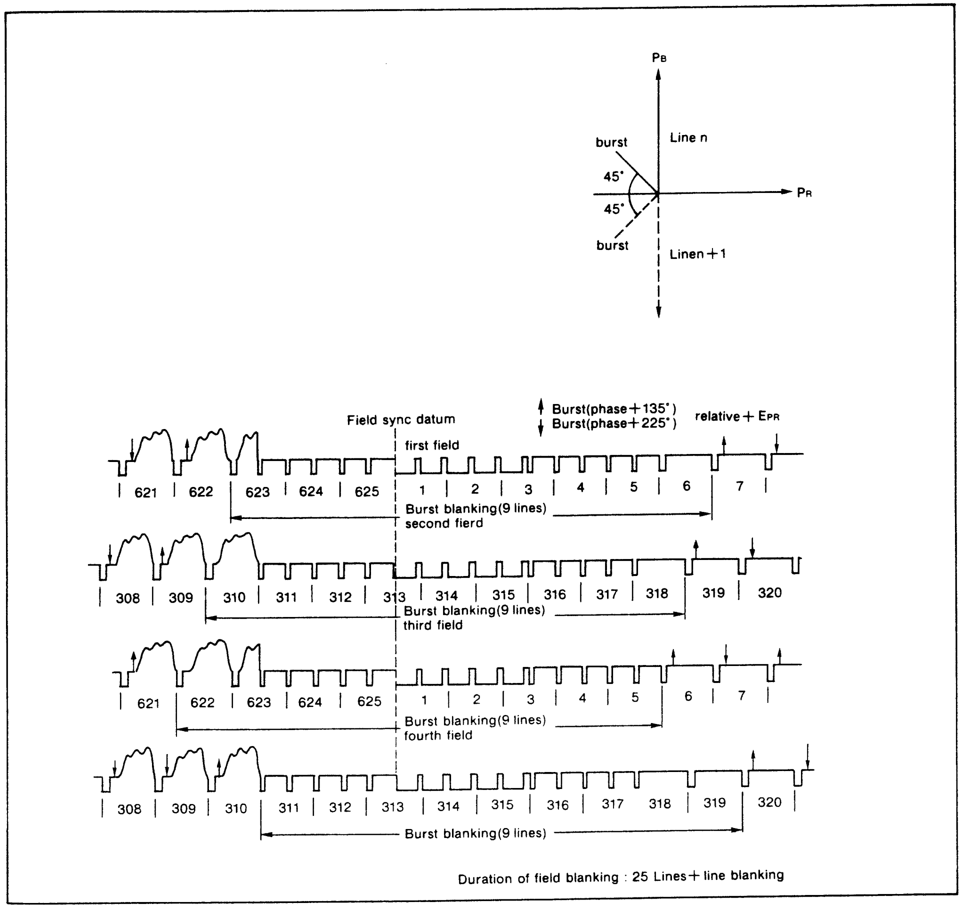

PB
burst
Line n
45°
45°
PR
burst
Linen+1
Field sync datum
Burst(phase+135°)
Burst(phase+225°)
relative+EPR
first field
621
622
623
624
625
1
2
3
4
5
6
7
Burst blanking(9 lines)
second fierd
308
309
310
311
312
313
314
315
316
317
318
319
320
Burst blanking(9 lines)
third field
621
622
623
624
625
1
2
3
4
5
6
7
Burst blanking(9 lines)
fourth field
308
309
310
311
312
313
314
315
316
317
318
319
320
Burst blanking(9 lines)
Duration of field blanking : 25 Lines+line blanking

Figure 3—36 Colouv Framing

In the conventional VTRs, the continuity of the burst signals might not be kept at the cut-in or cut-out point in the editing. That was 50-50 chance.
Now, In this model, colour framing circuit is equipped to be free from the colour frushing by keeping the continuity of the burst signals.
The overall block diagram of the colour framing circuit is shown in figure 3-37.

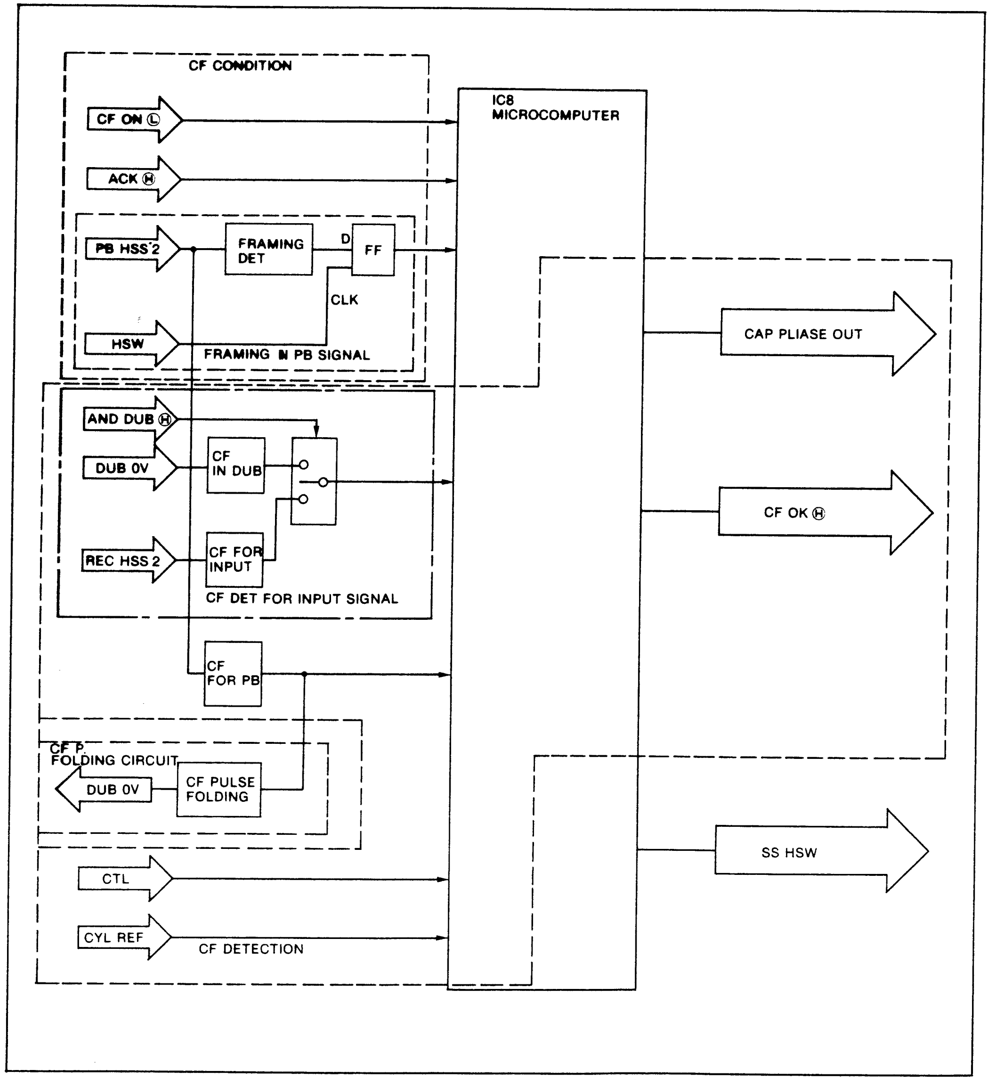

CF CONDITION
CF ON Ⓛ
ACK Ⓗ
PB HSS 2
FRAMING DET
D
FF
CLK
HSW
FRAMING IN PB SIGNAL
IC8 MICROCOMPUTER
CAP PLIASE OUT
CF OK Ⓗ
AND DUB Ⓗ
DUB OV
CF IN DUB
REC HSS 2
CF FOR INPUT
CF DET FOR INPUT SIGNAL
CF FOR PB
CF P. FOLDING CIRCUIT
DUB OV
CF PULSE FOLDING
SS HSW
CTL
CYL REF
CF DETECTION

Figure 3–37 Colow Framing Block

This circuit is mainly composed of the following three circuits:

1. CF (Colour Framing) Condition circuit
2. CF Detection circuit
3. CF Pulse Folding circuit

CIRCUIT DESCRIPTION

1) CF (Colour Framing) Condition

This circuit detects whether colour framing is allowed to adjust or not.
There are five signals used in this circuit: CF ON L, ACK H, INT L, PB HSS2 and HSS.
CF ON L signal is connected to the frame servo switch on the pocket of the front panel and when the switch is set to colour framing, CF ON L signal is fed to microcomputer IC8-16 and IC8 detects colour framing should be adjusted, and IC8 detects colour signal exsists (not black and white signal) at pin 18.
Also using PB HSS signal and HSS signal, microcomputer detects whether framing of the playback signal is locked or not.
These are detected in IC8 during about 500msec. after the frame servo switch on the pocket of the front panel is set to colour framing position, and after that colour framing detected and adjusted.

2) CF Detection

Colour framing is detected using Dub 0V or REC HSS2, PB HSS2, REC PHASE and PB PHASE signals. There are mainly 2 circuit in this CF Detection circuit.

A. CF DETECTION FOR INPUT SIGNAL
   a) CF DETECTION IN LINE
   b) CF DETECTION IN DUB

B. CF DETECTION FOR PB SIGNAL

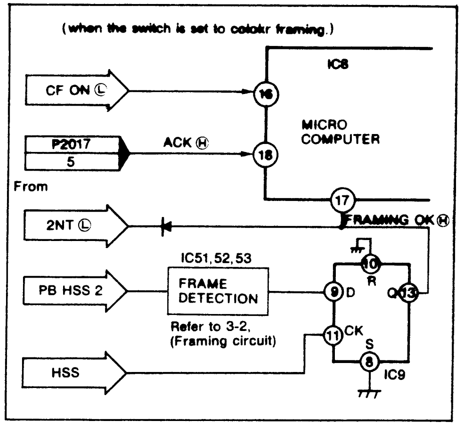
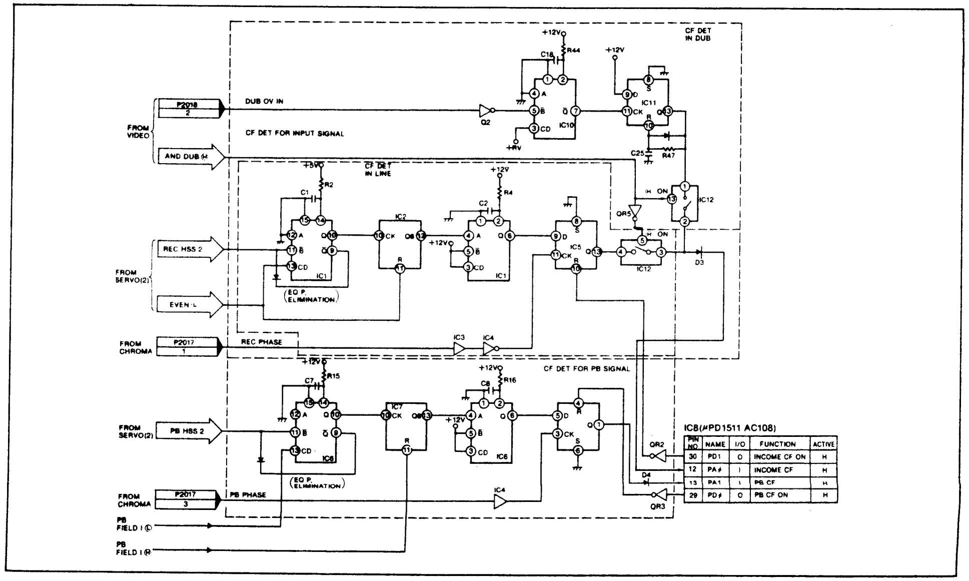

(when the switch is set to colokr framing.)
IC8
CF ON Ⓛ
16
MICRO COMPUTER
P2017
5
ACK Ⓗ
18
From
17
2NT Ⓛ
FRAMING OK Ⓗ
IC51,52,53
10
R
PB HSS 2
FRAME DETECTION
9
D
Q
13
Refer to 3-2, (Framing circuit)
11
CK
S
8
HSS
IC9

Figure 3–38 CF Condition

Microcomputer IC8 receives CTL and CYL REF signals besides signals from above circuits.
Signals from CF detection circuit for input signal and CF detection circuit for playback signal, namely INCOME CF and PB CF signals are sent to IC8. When INCOME CF and PB CF signals are in phase, microcomputer IC8 doesn't need phase adjustment for the capstan. If these signals are out of phase, IC8 needs phase adjust using CAP PHASE signal.
Block diagram, Phase detection timing and adjustment are shown in figure. 3-39, 3-40, and 3-41.


CF DET IN DUB
+12V
R44
C18
+12V
IC11
P2018
2
DUB OV IN
FROM VIDEO
CF DET FOR INPUT SIGNAL
Q2
IC10
AND DUB
C25
R47
CF DET IN LINE
R2
C1
IC2
C2
R4
+12V
IC12
ON
IC1
IC5
REC HSS 2
FROM SERVO(2)
EQ P. ELIMINATION
EVEN L
D3
P2017
1
FROM CHROMA
REC PHASE
IC3
IC4
CF DET FOR PB SIGNAL
R15
C7
R16
C8
IC7
IC6
FROM SERVO(2)
PB HSS 2
EQ P. ELIMINATION
QR2
D4
QR3
P2017
3
FROM CHROMA
PB PHASE
IC4
PB FIELD I Ⓛ
PB FIELD I Ⓗ

IC8(μPD1511 AC108)

PIN NO	NAME	I/O	FUNCTION	ACTIVE
30	PD1	O	INCOME CF ON	H
12	PA ϕ	I	INCOME CF	H
13	PA1	I	PB CF	H
29	PD ϕ	O	PB CF ON	H

Figure 3–39 CF Detection Block Diagram

ADJUSTMENT CONDITION: If the timing of INCOME CF and PB CF signals match over 2 in 3 times, the capstan phase is not adjusted.

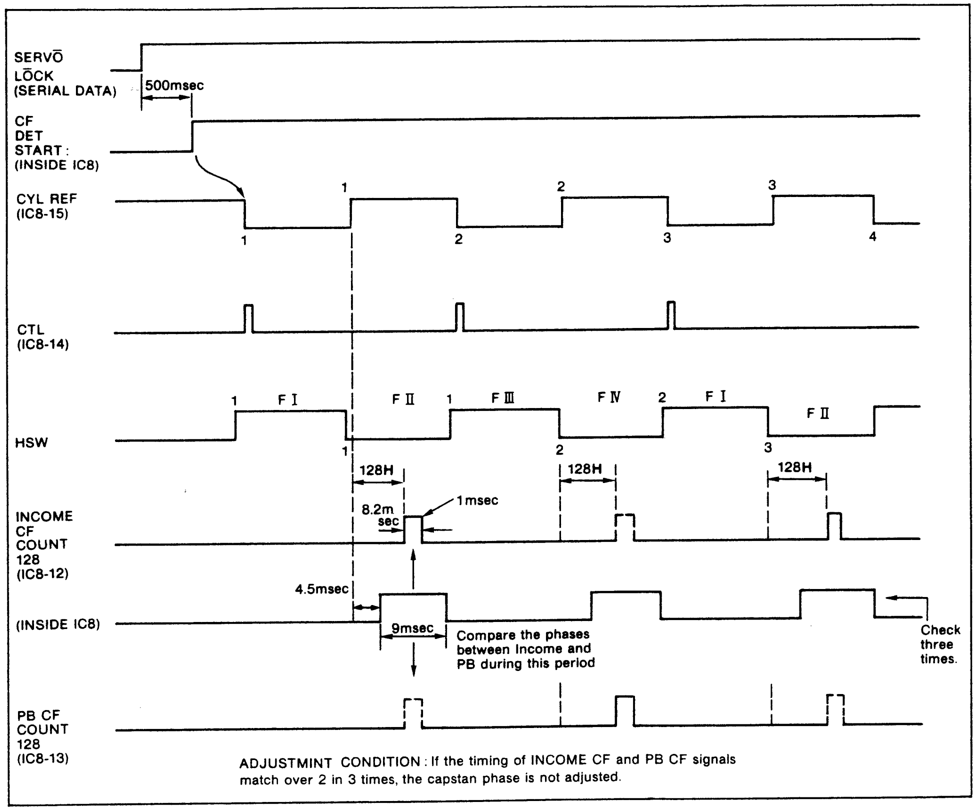

SERVŌ LŌCK (SERIAL DATA)
500msec
CF DET START: (INSIDE IC8)
CYL REF (IC8-15)
1
2
3
4
CTL (IC8-14)
HSW
F I
F II
F III
F IV
128H
INCOME CF COUNT 128 (IC8-12)
8.2m sec
1msec
4.5msec
(INSIDE IC8)
9msec
Compare the phases between Income and PB during this period
Check three times.
PB CF COUNT 128 (IC8-13)
ADJUSTMINT CONDITION : If the timing of INCOME CF and PB CF signals match over 2 in 3 times, the capstan phase is not adjusted.

Figure 3—40 Phase Detection Timing

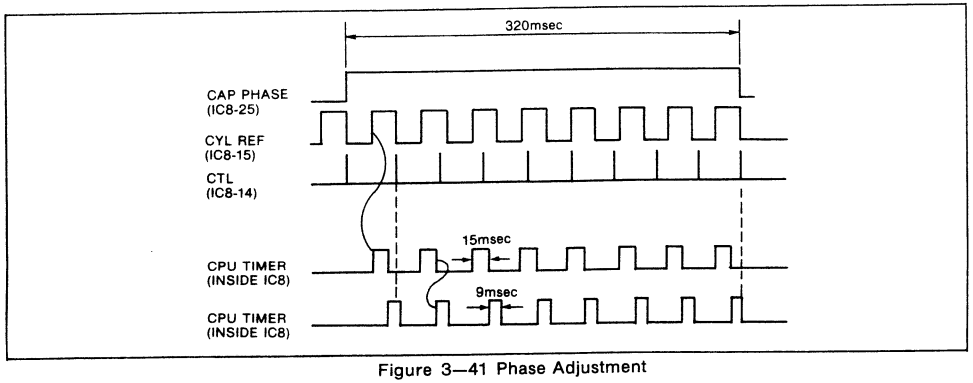

320msec
CAP PHASE (IC8-25)
CYL REF (IC8-15)
CTL (IC8-14)
CPU TIMER (INSIDE IC8)
15msec
CPU TIMER (INSIDE IC8)
9msec

Figure 3—41 Phase Adjustment

C. CF Detection for Input Signal

See Figure 3–39.
There are two ways as input. One in the signal from line input, the other is from dub input.

a) CF Detection In Line

When the BNC cable is connected to VIDEO INPUT, IC1, 2 and 5 are activated using REC HSS2 and EVEN L signals.

Timing is shown in figure 3–42.
In IC1, equalizing pulse is eliminated from REC HSS2 signal and then sent to IC2 in which 8.2msec delayed signal is produced resetting by input signal field 1 L. Then 60usec pulse triggered at the rising edge of IC2 is produced in IC1.
This 60usec pulse is used as data in IC5, on the other hand, REC PHASE signal is fed to IC5 as a clock.
Finally 128usec pulse is fed to IC8 (microcomputer) as INCOME CF signal.

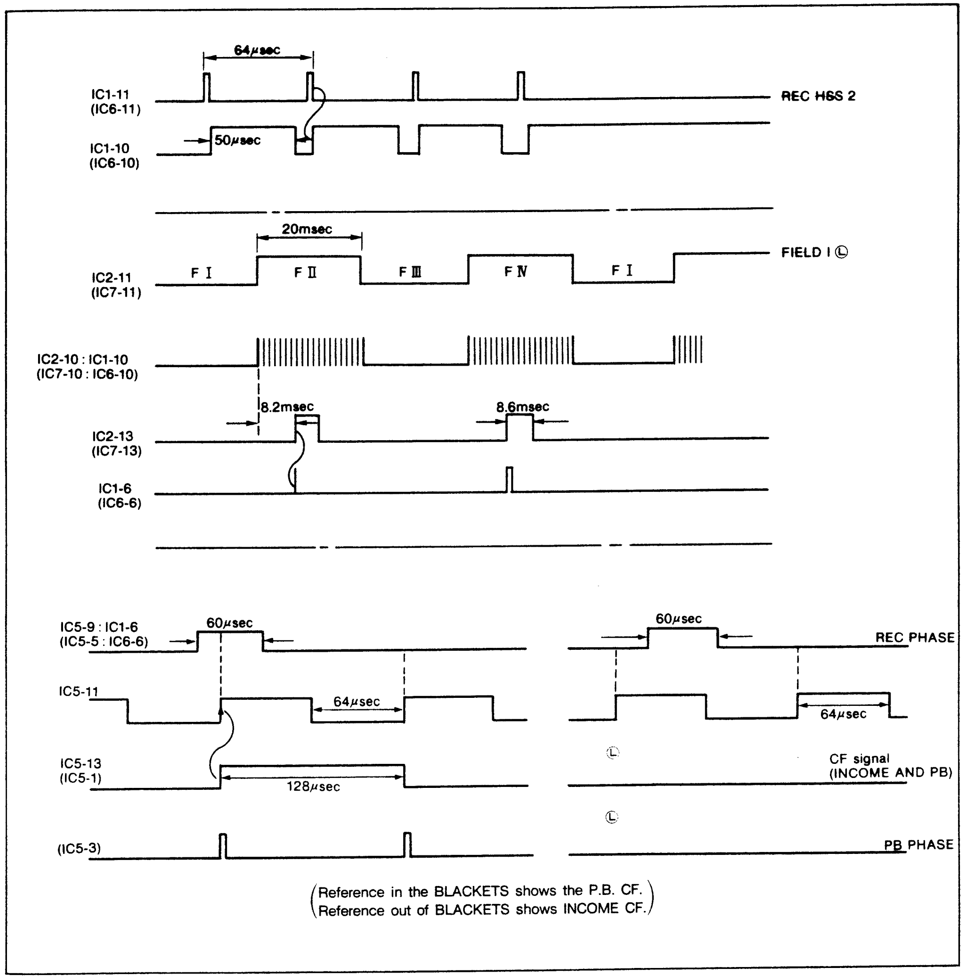

64μsec
IC1-11 (IC6-11)
REC HSS 2
IC1-10 (IC6-10)
50μsec
20msec
IC2-11 (IC7-11)
F I
F II
F III
F IV
FIELD I Ⓛ
IC2-10 : IC1-10 (IC7-10 : IC6-10)
8.2msec
8.6msec
IC2-13 (IC7-13)
IC1-6 (IC6-6)
IC5-9 : IC1-6 (IC5-5 : IC6-6)
60μsec
REC PHASE
IC5-11
64μsec
IC5-13 (IC5-1)
128μsec
Ⓛ
CF signal (INCOME AND PB)
(IC5-3)
PB PHASE
(Reference in the BLACKETS shows the P.B. CF.)
(Reference out of BLACKETS shows INCOME CF.)

Figure 3—42 CF Detection Timing

b) CF Detection In Dub

Colour frame pulse folded in the dub 0V signal of the dub cable when two AG-6500 VTRs are connected with dub cable is used to detect colour framing instead of the detection from sync signals.
CF pulse is at the beginning of the field III on the dub cable.
This pulse is fed to IC10 whose pulse width is 68msec and then 128usec pulse is produced at the rising edge of the signal from IC10.

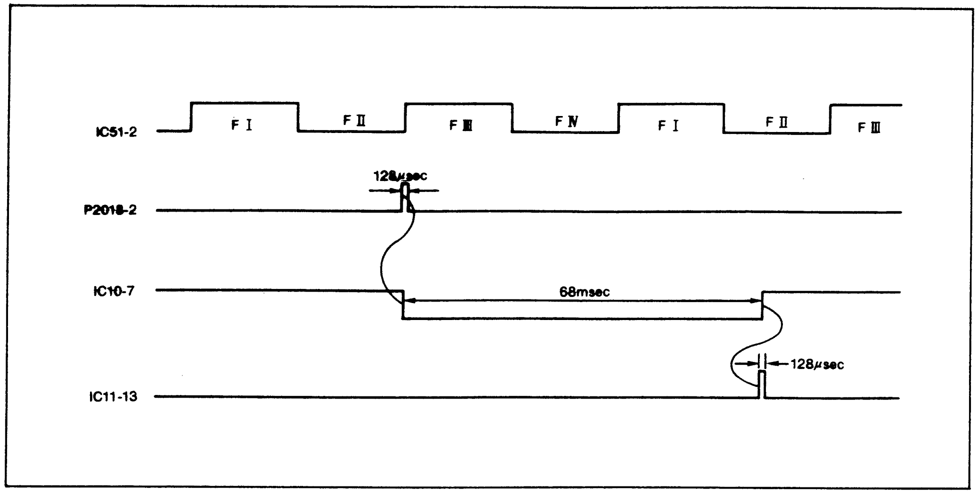

IC51-2
F I
F II
F III
F IV
F I
F II
F III
128μsec
P2018-2
IC10-7
68msec
128μsec
IC11-13

Figure 3—43 CF Detection Timing IN Dub

D. CF Detection For PB Signal

See figure 3-42.
The operation of the way how to detect the colour framing in playback signal is the same fashion as CF Detection.
In Line of CF Detection for Input Signal.

3) CF Pulse Folding circuit

When AG6500 connected with dub cable is used as a source deck, another AG6500 (Editor) has to detect colour framing. So, the porpose of this circuit is to fold the colour framing pulse on the dub 0V signal of dub-out.
Colour framing detect signal for the playback signal is sent to IC10-12. From IC10, 22msec high signal is fed out to IC11, and also from IC51-2, field I and III H signal is supplied to IC11-3 as a clock.
By the rising edge of field III, 128usec width pulse is fed out from IC11 and the mixed with dub 0V signal on the VIDEO circuit.
The block diagram and timing are shown in figure 3-44 and 3-45.

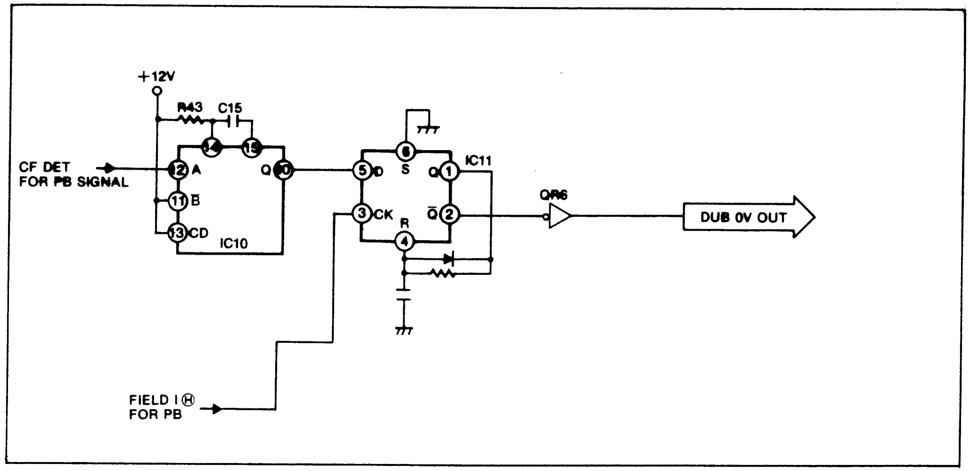

+12V
R43
C15
CF DET
FOR PB SIGNAL
12 A
11 B̄
13 CD
14
15
Q 10
IC10
6
S
5 D
Q 1
3 CK
R
Q̄ 2
4
IC11
QR6
DUB 0V OUT
FIELD I Ⓗ
FOR PB

Figure 3—44 CF Pulse Folding

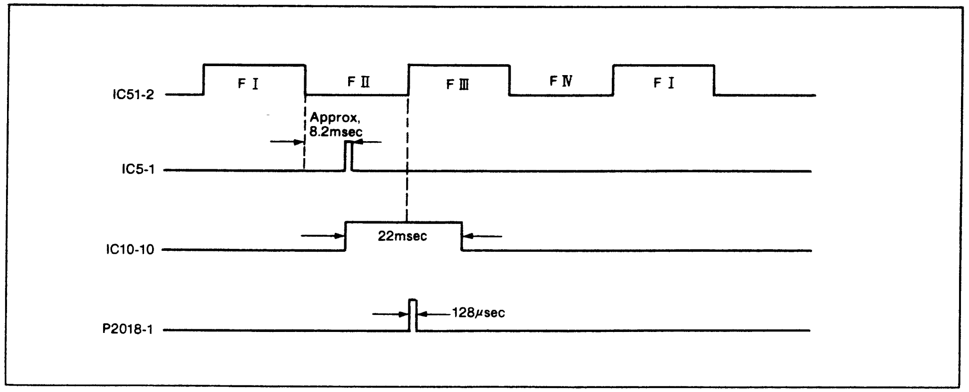

IC51-2
F I
F II
F III
F IV
F I
Approx,
8.2msec
IC5-1
IC10-10
22msec
P2018-1
128μsec

Figure 3—45 CF Pulse Folding Timing

4. Reel Section (REF NO.2700 Series)

4-1. GENERAL DESCRIPTION

The Reel Servo Circuit drives the reel turntables, using independent direct drive motors for both the Supply and Tade-up reel. This assures precise control of the tape tension in both directions and at the search speeds.

The Reel Servo operation is effectively applied to all modes of the AG6500 operation.

In the Loading, Unloading, Sub Loading, and Sub Unloading modes, only the Supply Reel motor is driven. The Take-up Reel always remains unactivated and the brake on, in order to hold the tape at a fixed location. This prevents miscounting of the control pulses, and more reliable edit point location.

In Play Forward/Reverse (or Record), both the Supply Reel Motor and the Take-up Reel Motor are driven. There are three tension sensors (supply reel forward tension, supply reel reverse tension and take-up tension sensors) which continually monitor the supply tension and take-up tension of the tape. This allows the tension of the tape to be precisely adjusted.
The tension sensors use the LED light source/photo-sensor principal to detect tape tension.

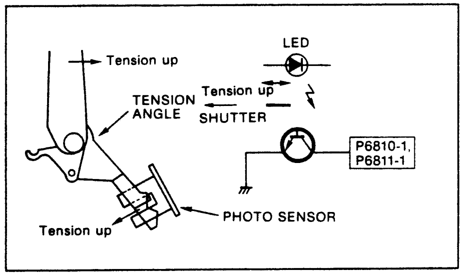

Tension up
LED
TENSION ANGLE
Tension up
SHUTTER
P6810-1, P6811-1
PHOTO SENSOR
Tension up

Figure. 4—1 Supply Tension Sensor

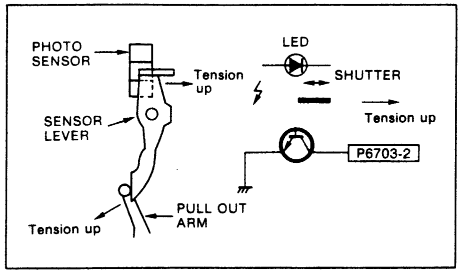


PHOTO SENSOR
LED
Tension up
SHUTTER
SENSOR LEVER
Tension up
P6703-2
PULL OUT ARM
Tension up

Figure. 4—2 Takeup Tension Sensor

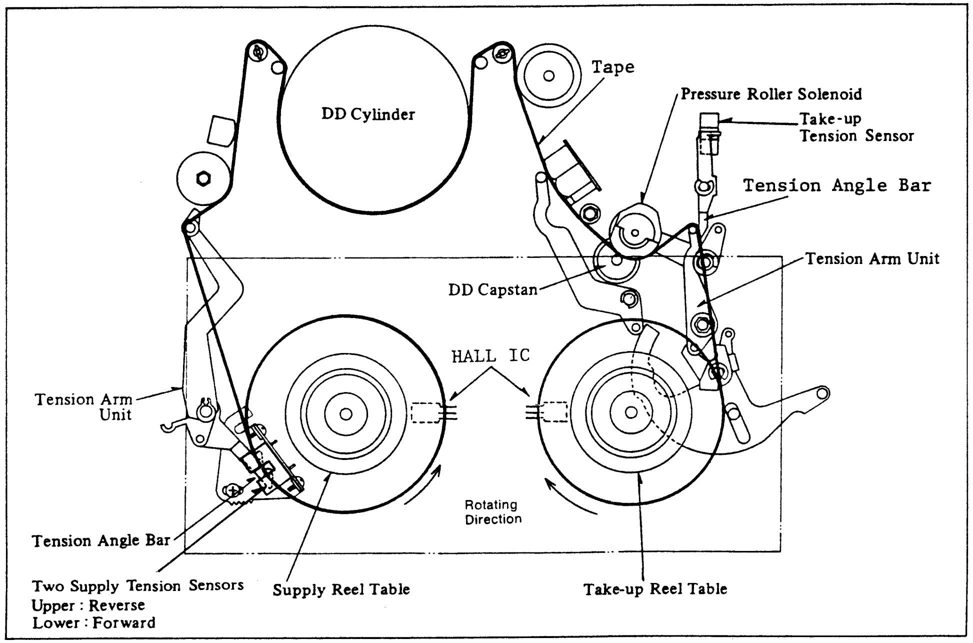

DD Cylinder
Tape
Pressure Roller Solenoid
Take-up Tension Sensor
Tension Angle Bar
Tension Arm Unit
DD Capstan
HALL IC
Tension Arm Unit
Rotating Direction
Tension Angle Bar
Two Supply Tension Sensors
Upper : Reverse
Lower : Forward
Supply Reel Table
Take-up Reel Table

Figure. 4—3 Sensors

When less tension is needed, such as at the beginning of the tape, a metal shutter moves away from the light beam. This changes the intensity of the light at the sensor, which then decreases the reel motor torque. When more tension is needed, the shutter moves into the light beam, and the change at the sensor causes the reel motor torque to increase.

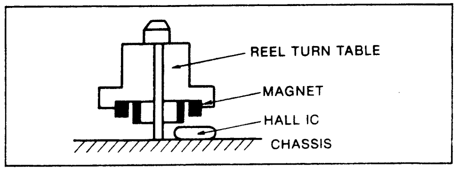

REEL TURN TABLE
MAGNET
HALL IC
CHASSIS

Figure. 4—4 Hall IC

In the Fast Forward and Rewind modes, both the supply reel motor and the take-up motor are driven. Both the supply and take-up reels have 16 ring magnets and a Hall effect IC located under the edge of each reel. The HALL IC detects the position of the magnets and the HALL IC output signal is a square wave.
This is turned into DC level.
The DC level then controls the fast winding speed through the Reel Servo Circuit.
When the Reel tables rotate too fast, the DC level of the output of the HALL IC decreases, because the frequency from HALL IC is going higher and inverted. When the DC level decreases, motor torque also decreases and the reel slows down.
When the Reel table rotates too slow, the DC level increases, because the frequency from HALL IC falls and inverted, which increases the reel motor torque and the speed.

4-2. CIRCUIT DESCRIPTION

1) Loading/Subloading mode

In the Loading or Subloading mode, the circuit operates in the same manner. So, the operation in the Loading mode will be explained.
a Loading Low signal appears at pin 6 of IC 16 (Microcomputer). The inverted High signal at pin 6 of IC9 is supplied to the resistive divider R36/R842 via D14 and the divided voltage becomes the error or tension signal at pin 5 of IC15. IC15 composes of a 40dB amplifier, and the certain voltage is fed to pin 4 of IC2. On the other hand, 29KHz Saw-tooth wave is supplied to pin 5 of IC14 and these two signals are compared in IC14. the output signal is smoothed in L4 and C26 filter circuit and fed to Supply Reel Motor.

Since the R36/R842 voltage is very small, the Supply reel provides a holdback tension attempting to run in the direction opposite to that in which tape is being pulled by the loading mechanism.
The motor speed is self controlled by detecting the voltage at R816 and feeding it back to the error amplifier, IC15.
If motor current increases, the voltage at the corrector of Q3 also increases and it feeds back to Pin 6 of IC15 to decrease the motor current.
Also the voltage at the corrector of Q3 is fed to IC17 and back to the base of Q3 via Q7. Thus the supply reel motor current is held at about 30mA.
Refer to Figure 4-5.

2) Unloading/Sub Unloading mode

In the Unloading mode, an Unloading Low signal is applied to inverter IC9-pin11 from microcomputer IC16. The inverted High signal then goes to IC15-5 throngh R35 and D13.

The change in value of R35 (Compared to R36, above) changes the motor drive.
The supply reel motor drive circuit function is the same as was described in the loading and subloading modes except the supply reel motor drive current which is now held at about 120mA.
Refer to Figure 4-5.

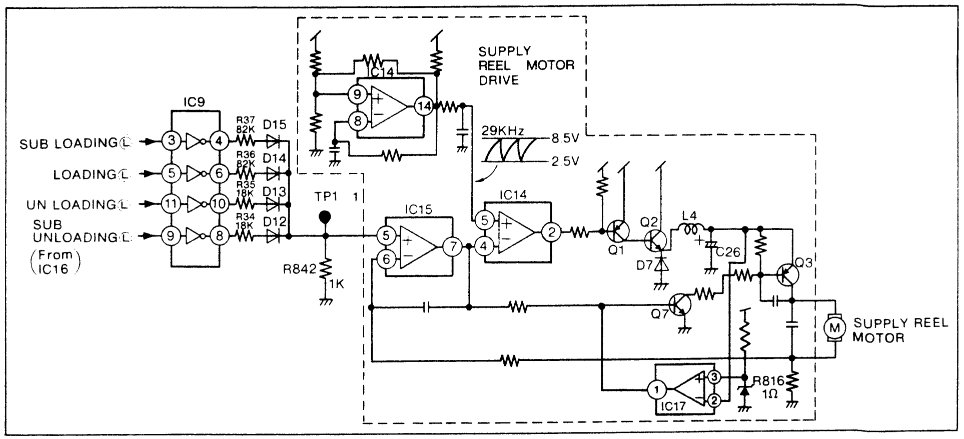

SUPPLY REEL MOTOR DRIVE
IC14
9
8
14
IC9
SUB LOADING Ⓛ
LOADING Ⓛ
UN LOADING Ⓛ
SUB UNLOADING Ⓛ
(From IC16)
3
4
5
6
11
10
9
8
R37 82K
R36 82K
R35 18K
R34 18K
D15
D14
D13
D12
TP1
1
R842
1K
29KHz
8.5V
2.5V
IC15
5
6
7
IC14
5
4
2
Q1
Q2
D7
L4
C26
Q3
Q7
SUPPLY REEL MOTOR
M
IC17
1
2
3
R816
1Ω

Figure 4—5 Loading/Unloading

3) Forward Play mode

In the PLAY, REC/PLAY, and Search Forward modes the Supply Reel and Take-up Reel Tension is controlled by both Tension sensors.
Figure 4-6 shows a block diagram of the Forward/Reverse Play mode reel servo.
During the Forward play mode, microcomputer IC16 generates a Forward Playback Low signal from pin32 and a T (Play L) signal. These signals enable to control the Supply and Takeup reels using Supply Forward and Takeup Reel sensors respectively by turning the switches IC11 and IC12 ON.

Since the capstan can move the tape at various rates of speed (because of the search mode), and since the tape tension should be constant, even with varying diameters of tape on the tape hubs, both the supply and the take-up tension controls are needed.
Both tension posts are pulled by the tape, and in turn move a shutter. As was briefly described above, this shutter travels between an LED and a phototransistor, allowing more or less light to pass. With more light, the transistor conducts more (lower forward resistance), and with less light, it conducts less (higher forward resistance).

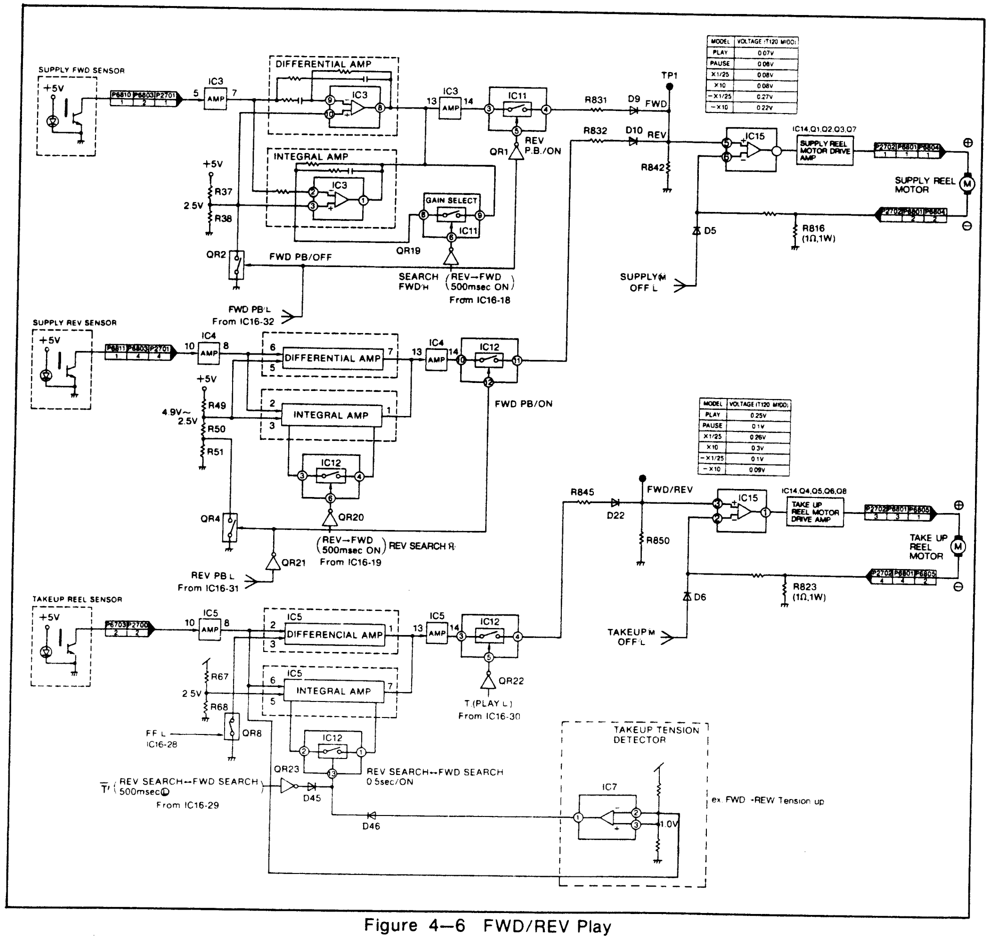

SUPPLY FWD SENSOR
+5V
P6810 P6603 P2701
IC3
AMP
DIFFERENTIAL AMP
INTEGRAL AMP
GAIN SELECT
IC11
IC3
+5V
R37
2.5V
R38
QR2
FWD PB/OFF
QR19
QR1
REV P.B./ON
TP1
R831
D9
FWD
R832
D10
REV
R842
D5
MODEL | VOLTAGE (T120 MIDD)
PLAY | 0.07V
PAUSE | 0.08V
X1/25 | 0.08V
X10 | 0.08V
-X1/25 | 0.27V
-X10 | 0.22V
IC15
IC14,Q1,Q2,Q3,Q7
SUPPLY REEL MOTOR DRIVE AMP
P2702 P6801 P6804
SUPPLY REEL MOTOR
R816 (1Ω,1W)
SEARCH FWD H (REV→FWD 500msec ON) From IC16-18
SUPPLY M OFF L
FWD PB L From IC16-32
SUPPLY REV SENSOR
IC4
DIFFERENTIAL AMP
INTEGRAL AMP
IC12
4.9V~2.5V
R49
R50
R51
FWD PB/ON
QR4
QR20
(REV→FWD 500msec ON) REV SEARCH H From IC16-19
QR21
REV PB L From IC16-31
MODEL | VOLTAGE (T120 MIDD)
PLAY | 0.25V
PAUSE | 0.1V
X1/25 | 0.26V
X10 | 0.3V
-X1/25 | 0.1V
-X10 | 0.09V
R845
D22
FWD/REV
R850
IC14,Q4,Q5,Q6,Q8
TAKE UP REEL MOTOR DRIVE AMP
TAKE UP REEL MOTOR
R823 (1Ω,1W)
D6
TAKEUP M OFF L
TAKEUP REEL SENSOR
IC5
DIFFERENCIAL AMP
INTEGRAL AMP
R67
2.5V
R68
QR8
FF L IC16-28
QR22
T (PLAY L) From IC16-30
T' (REV SEARCH→FWD SEARCH 500msec L) From IC16-29
QR23
D45
D46
REV SEARCH→FWD SEARCH 0.5sec/ON
TAKEUP TENSION DETECTOR
IC7
1.0V
ex. FWD→REW Tension up

Figure 4-6 FWD/REV Play

A. Supply Reel Forward Control

See Figure 4-6 and 4-1.
Depending upon the position of the tension arm, a voltage is applied to pin 5 of IC3 from the phototransistor.
The amplifier output signal at IC3-7 then goes to the integral and differencial amplifiers IC3.
The purpose of this integral amplifier circuit is to prevent hunting of the reel motor rotation and the one of this differencial amplifier circuit is to get a quick response on the reel motor.
Also, by using the switch IC11, the gain of the integral amplifier is changed and only the gain of the differencial amplifier will be used for about 500 msec in the change from Reverse mode to Forward mode. This is performed by the Search Forward High Signal from Microprocessor IC16-18.
The output of the phototransistor varies from 0V to 5V from the beginning to the end of a tape.
When the tension of the tape is high, the output of the phototransistor becomes 0V. In this case, tension will be reduced so that the output increases to 2.5V because the voltage of the plus input of IC3 is determined by R37 and 38 as a reference voltage and IC3 functions as a comparator amplifier.
When the tension of the tape is low, the output of the phototransistor becomes 5V. In this case, the tension will be increased until the output decreases to 2.5V.
In the all modes except the Forward Playback mode, QR2 is turned ON and the reference voltage is 0V.
When the Forward Playback mode is selected, QR2 is turned OFF and the voltage becomes 2.5V.
That is to say, at the moment of the beginning portion of the Forward Playback mode, the reference signal makes the Supply Reel Motor turn with larger torque.

B. Takeup Reel Control

Takeup Reel control circuit functions fundamentally in the same manner as the Supply Reel Forward control circuit. To detect the voltage from the phototransistor, the differencial and integral amplifiers are used, and drive the takeup reel motor. Only difference is the timing of the switch IC12 to avoid passing through the Integral amplifier IC5.
This switch IC12 turns ON for about 500 msec at the beginning point in the both Forward and Reverse mode.
Also, the switch IC12 is turned OFF when takeup tension is higher than usual and the output of the phototransistor becomes less than 1.0V, and the gain of the Integral amplifier is changed, and the Takeup Reel Motor gets less tension.

4) Reverse Play mode

In the Reverse Play mode, Supply Rev Sensor and Takeup Reel Sensor are used as shown in Figure 4-6.
The voltage output from the phototransistor is fed to the Differencial and the Integral amplifiers IC4 and the mixed DC signal is supplied to the Supply Reel Drive circuit. The reference voltage at the Differencial and the Integral amplifiers are normally fixed at 2.5V.
But in the all modes except REVERSE mode, this voltage is 4.9V. Namely when the Reverse mode is selected from the Forward mode for example, the output from the amplifiers is low voltage at the moment and then become higher to rotate the Supply Reel Motor slowly at the beginning of the Reverse mode.
This is performed by QR4.

The Takeup Reel control and the other Supply Reverse control circuits function in the same manner as the Supply Forward control circuit.
The timing of each mode is shown in Figure 4-7.

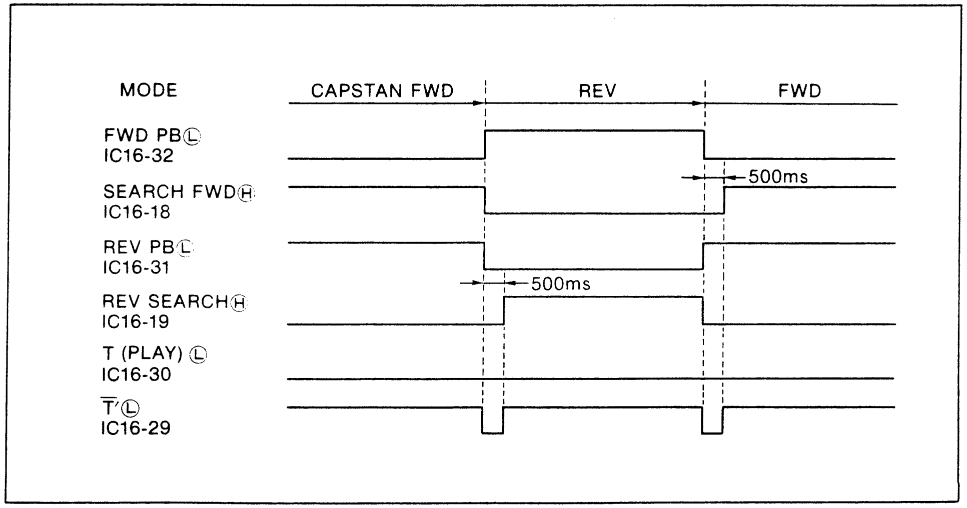


Figure. 4-7 FWD/REV Timing

5) Fast Forward/Rewind mode.

In the Fast Forward and Rewind mode, supply and takeup Hall ICs are used to control the reel motor speed and torque.

A. Fast Forward mode

In the Fast Forward mode, Supply Reel Motor is driven by the signal from the Takeup Hall IC and the signal from the microcomputer IC16-26 (FF L), and Takeup Reel Motor is also driven by the signal from the Takeup Hall IC and the Supply Hall IC.
The signals which were detected in the Takeup and Supply Hall IC's are fed to the Frequency Doubler (IC10) and 35 usec or 55 usec pulse is produced at the falling and rising edge of the signal.

The frequency doubled signal is then inverted and fed to the MMV (IC1) which produces the pulse with 3.5msec width.
This pulse is integrated in IC2 and the output DC signal from pin 8 of IC2 is supplied to the Supply Reel Motor Drive circuit, and integrated DC signals from both Hall IC's are mixed at pin 2 of IC2. The other input of IC2 is controlled by QR15 and 16, and this composes of the Integral Amplifiers at the beginning point of the Fast Forward and Rewind modes.
This output is finally fed to the Takeup Reel Motor Drive circuit.

B. Rewind mode

Even in the Rewind mode, the operation is quite the same as the Fast Forward mode.

Integrated signal from IC2 is fed to the Supply Reel Motor Drive circuit, and the output of the Integral Amplifier IC2 from the Supply Hall IC is sent to the Takeup Reel Motor Drive circuit.

C. Tape End Control

When Tape End is detected by the supply or takeup photo sensor in the Fast Forward or Rewind mode, microcomputer IC6001 outputs Tape End Detect signal from pin 8 and this signal is supplied to IC8 in the Reel Servo circuit. In IC8, the pulse is produced and fed to the switches IC11 to turn off and finally Reel Motors are stopped quickly to protect the tape damaged.

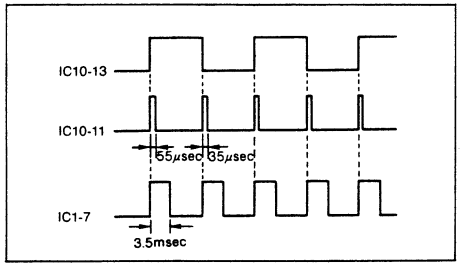
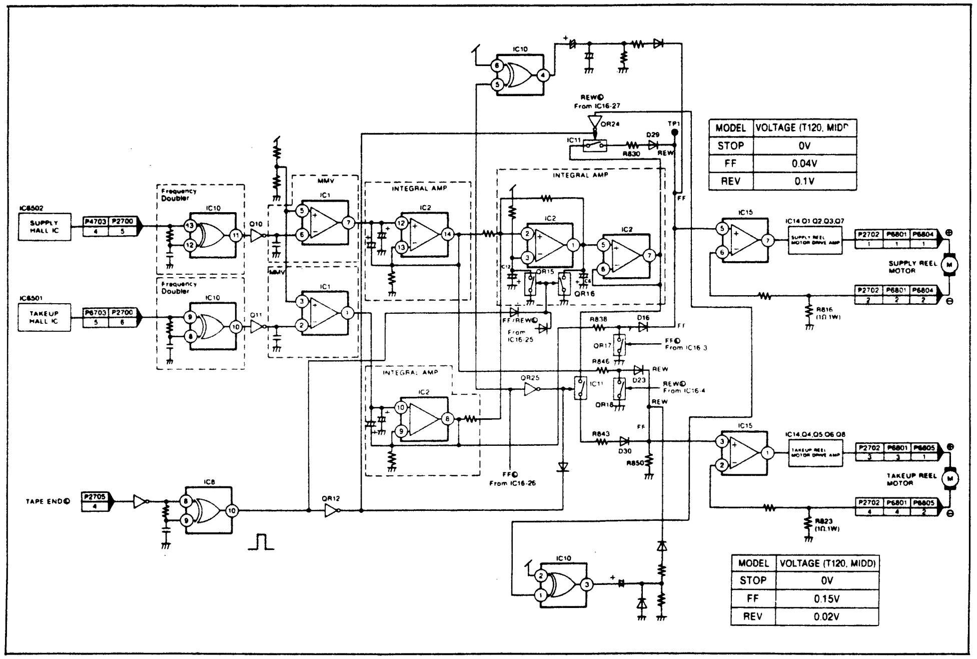


Figure. 4—9 FF/REW Timing



IC6502
SUPPLY HALL IC
P4703
P2700
IC6501
TAKEUP HALL IC
P6703
P2700
Frequency Doubler
IC10
MMV
IC1
INTEGRAL AMP
IC2
Q10
Q11
REW
From IC16-27
QR24
TP1
D29
IC11
R830
FF
QR15
QR16
FF/REW
From IC16-25
R838
D16
QR17
FF
From IC16-3
R846
REW
QR25
D23
REW
From IC16-4
QR18
R843
D30
R850
FF
From IC16-26
IC15
IC14 Q1 Q2 Q3 Q7
SUPPLY REEL MOTOR DRIVE AMP
P2702
P6801
P6804
SUPPLY REEL MOTOR
R816 (1Ω,1W)
IC14 Q4 Q5 Q6 Q8
TAKEUP REEL MOTOR DRIVE AMP
P2702
P6801
P6805
TAKEUP REEL MOTOR
R823 (1Ω,1W)
TAPE END
P2705
IC8
QR12
IC10

MODEL	VOLTAGE (T120, MIDD)
STOP	0V
FF	0.04V
REV	0.1V

MODEL	VOLTAGE (T120, MIDD)
STOP	0V
FF	0.15V
REV	0.02V

Figure. 4—8 FF/REW Control

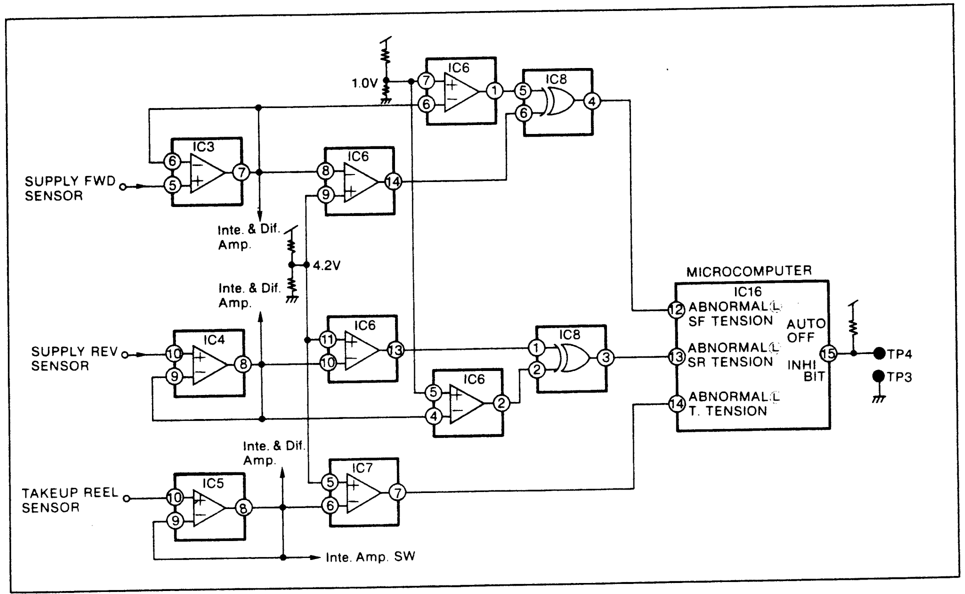
6) Auto Off

In the Reel Servo circuit, Reel Motor Lock and Abnormal Tension are detected as self check function. In this case, the deck will stop and reject any mode except power off. But when TP4 and 3 are connected by a jumper in this case, the deck won't indicate Auto Off and we can check the reasons why the deck indicates Auto Off.

A. Tension Detection

Tension Detection circuit detects the abnormal tension in any FWD/REV play mode by the three tension sensors.

In the FWD play modes, SF and T sensors are used, and in the REV play modes, SR and T sensors are used.
The two outputs from the tension sensors are fed to the comparators which have +4.2V inputs at their minus sides and which have +1.0V inputs at their plus sides, and another one from Takeup Reel sensor is supplied to only one comparator which has +4.2V input at it's plus side.
If at least one of three inputs is over 4.2V or belows 1.0V, Low signal will appear at the output of IC8 and sent to Microcomputer IC16 and AUTO OFF lamp will light up, and also the counter indicates "E-6" that means Abnormal Tension.



1.0V
IC6
IC8
IC3
IC6
SUPPLY FWD SENSOR
Inte. & Dif. Amp.
4.2V
Inte. & Dif. Amp.
MICROCOMPUTER
IC16
ABNORMAL L SF TENSION
AUTO OFF
ABNORMAL L SR TENSION
INHI BIT
ABNORMAL L T. TENSION
TP4
TP3
SUPPLY REV SENSOR
IC4
IC6
IC8
IC6
Inte. & Dif. Amp.
TAKEUP REEL SENSOR
IC5
IC7
Inte. Amp. SW

Figure 4—10 Tension Detection

B. Reel Lock

The outputs from the Supply and Takeup Reel IC's are directly fed to microcomputer IC16 pin 16 and 17. Reel lock is detected in IC16 by using these signals, and this results in the Auto OFF flush and the indication of "E-5" that means Reel Motor Lock on the counter.

5. Video Section

5-1. GENERAL DESCRIPTION

In this VTR, there are many new circuits adapted on the Video circuit to acheive high picture quality even in the playback of the 3rd generation.
Introductions to the new circuits, follow.

1) High Quality Picture

High quality is attained without affecting the interchangeability with convertional models. This model employs the following three categories.

CATEGORY	EFFECT	DESCRIPTION
WHITE CLIP 20% UP	CLARIFICATION OF CHARACTERS	HERETOFORE THE CHANGE FROM BLACK TO WHITE HAS BEEN INPROVED BY PRE-EMPHASIS ON RECORDING BUT WHITE CLIP IS PERFORMED AT A CERTAIN LEVEL BECAUSE OF THE RESTRICTION OF THE REPRODUCTION CAPACITY OF THE HEAD. IT IS FURTHER RAISED BY 20% BY THE INCREASE IN REPRODUCTION CAPACITY AND SO FORTH OF THE HEAD TO FURTHER SHARPEN PICTURE CONTRAST.
DETAIL ENHANCER	CLARIFICATION OF DETAILS (BY.HAIR,WOODS)	HIGH FREQUENCY IS GIVEN TO DETAILED PICTURES OF HAIR, WOODS AND SO FORTH. IF SUCH SIGNALS ARE NORMALLY RECORDED, THE DETAILED PARTS CANNOT BE ACCURATELY REPRODUCED, SO A VAGUE PICTURE IS FREQUENTLY PRODUCED. DETAIL ENHANCER INCREASES DETAIL REPRODUCIBILITY BY RECORDING HIGH-FREQUENCY SIGNALS WITH EMPHASIS.
RECURSIVE FILTER	INCREASE OF COLOUR S/N	NOISE IS DETECTED BY LINE CORRELATION AND REMOVED BY SUBJECTING ORIGINAL SIGNALS TO CANCEL TO INCREASE COLOUR S/N RATIO DURING PLAY.

Figure 5—1 High Quality

2) Input Select Switch circuit

Located on the Front Panel. It can select one input of three modes, TV 8 pin, DUB or LINE, and also enables special operations to be effective especially in the editing.

INPUT SELECT SW	INPUT			DETAIL ENHANCER	NOISE CANCELLER	RECURSIVE FILTER
	TV 8PIN	LINE	DUB			
TV	○	×	×	○	○	○
LINE	×	○	×	○	○	○
DUB	×	※1 ○	※1 ○	×	※2 △	×

※1. DUB INPUT IS PRIOR TO LINE INPUT WHEN SIGNAL IS INPUTTED FROM DUB IN.
※2. LINE CORRELATION NOISE CANCELLER AND DUB NOISE CANCELLER ARE ON

Figure 5—2 Input Select Switch

When the AG-6500 are connected via the Line Inputs and the Input Select Switchs are set to dub position (on editor and source machine).
The noise canceller and recursive filter circuits don't operate in the source side and the detail enhancer circuit doesn't in the editor side.

3) Lower Jitter

Newly developed integrated circuits for chrominance and bearing post as a P2 roller post are adopted in this editing machine to lift third generation picture quality even above that of conventional second generation tapes. It is performed by getting lower jitter.
This video section consists of two circuit blocks, one block is video circuit which is used mainly for the luminance process, and the other is chrominance circuit which is used for the chrominance process. Video circuit is explained in 5-2, chrominance circuit in 5-3. The overall block diagram is shown in Figure 5-3.

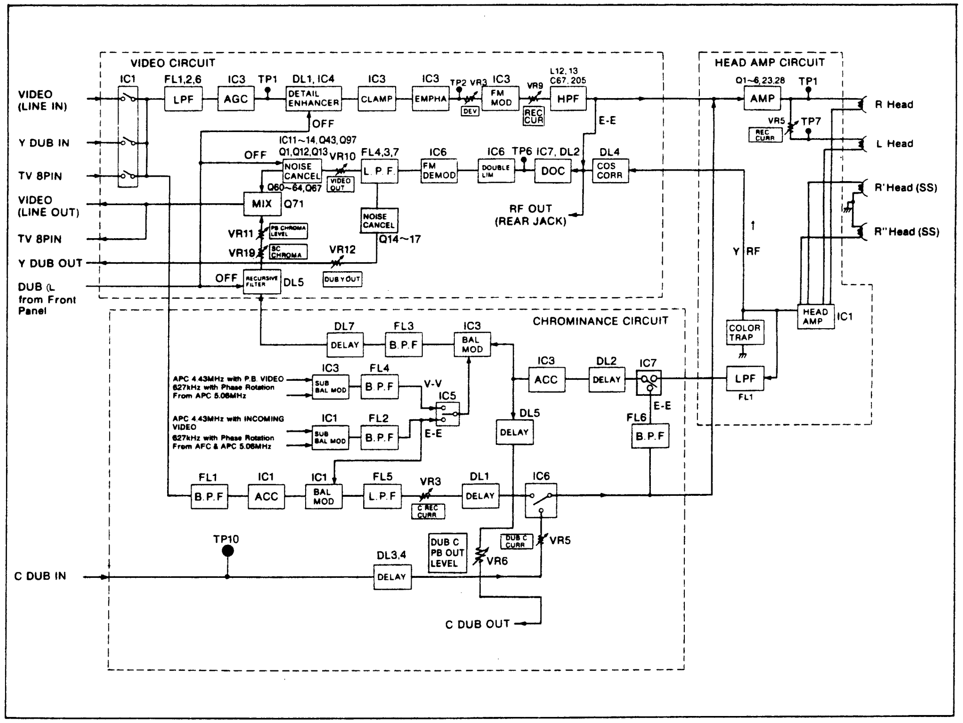

VIDEO CIRCUIT
VIDEO (LINE IN)
Y DUB IN
TV 8PIN
VIDEO (LINE OUT)
TV 8PIN
Y DUB OUT
DUB (L from Front Panel
IC1
FL1,2,6
LPF
IC3
AGC
TP1
DL1, IC4
DETAIL ENHANCER
IC3
CLAMP
IC3
EMPHA
TP2 VR3
DEV
IC3
FM MOD
VR9
REC CUR
L12, 13 C67, 205
HPF
E-E
OFF
IC11~14, Q43, Q97 Q1,Q12,Q13
OFF
NOISE CANCEL
VR10
VIDEO OUT
FL4,3,7
L. P. F.
IC6
FM DEMOD
IC6
DOUBLE LIM
TP6
IC7, DL2
DOC
DL4
COS CORR
Q60~64,Q67
MIX
Q71
NOISE CANCEL
Q14~17
RF OUT (REAR JACK)
VR11
PB CHROMA LEVEL
VR19
SC CHROMA
VR12
DUB Y OUT
OFF
RECURSIVE FILTER
DL5
CHROMINANCE CIRCUIT
DL7
DELAY
FL3
B.P.F
IC3
BAL MOD
APC 4.43MHz with P.B. VIDEO
627kHz with Phase Rotation From APC 5.06MHz
IC3
SUB BAL MOD
FL4
B.P.F
V-V
IC5
APC 4.43MHz with INCOMING VIDEO
627kHz with Phase Rotation From AFC & APC 5.06MHz
IC1
SUB BAL MOD
FL2
B.P.F
E-E
IC3
ACC
DL2
DELAY
IC7
E-E
DL5
DELAY
FL6
B.P.F
FL1
B.P.F
IC1
ACC
IC1
BAL MOD
FL5
L.P.F
VR3
C REC CURR
DL1
DELAY
IC6
TP10
DL3,4
DELAY
DUB C PB OUT LEVEL
VR6
DUB C CURR
VR5
C DUB IN
C DUB OUT
HEAD AMP CIRCUIT
Q1~6,23,28
AMP
TP1
VR5
REC CURR
TP7
R Head
L Head
R'Head (SS)
R''Head (SS)
Y
RF
HEAD AMP
IC1
COLOR TRAP
LPF
FL1

Figure 5—3 Video Overall Block Diagram

This editing VCR enables the use of dubbing cables in the editing or dubbing mode. In this condition, the following signals are fed from the source side to the edit side as shown in Figure 5-4.

Note: This machine cannot perform the editing with 3/4 " VTR (NV-9600 etc) using the dubbing cable.

- ●Luminance Signal (0~4MHz)
- ●Down-Converted Chrominance Signal with Phase Rotation (627kHz)
- ●Inverted Head Switching Signal

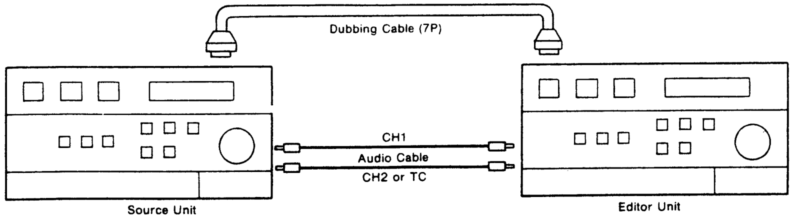

Dubbing Cable (7P)
CH1
Audio Cable
CH2 or TC
Source Unit
Editor Unit

Figure 5—4 Dubbing Connection

5–2. VIDEO CIRCUIT (LUMINANCE CIRCUIT)
(REF. NO. 3000 SERIES)

1) Luminance Recording circuit

Composite video signal from LINE INPUT or TV 8 Pin or luminance signal from DUB INPUT, switched in IC1 is sent to LPF (Low Pass Filter). Composite video signal passes through FL1 and FL6 which eliminate frequency over 3 MHz. If the video signal is a colour signal, it must be stripped of its chrominance portion in order to provide a luminance only signal for FM modulation. On the other hand, luminance signal from DUB INPUT passes through FL2 which eliminates frequency over 5MHz.

Then video signal is sent to AGC (Automatic Gain Control) inside IC3 which attenuates or amplifies the signal as needed to produce a constant amplitude signal, also the gain of the signal can be slightly changed by the VIDEO LEVEL VOLUME and the switch on the front panel. The next stage is Detail Enhancer circuit, IC4 and DL1 which increases detail reproducibility by recording high frequency signals with emphasis.

The video signal, containing only luminance information is processed through several stages inside IC3 to prepare it for FM modulation.

One stage is clamp circuit which establishes a horizontal sync reference at the back porch of every horizontal sync pulse (the video black level).

The signal is then sent to main–emphasis, which boosts the high frequencies to compensate for the recording process.

It will be attenuated during playback and demodulation (De–emphasis) in order to increase the overall signal to noise ratio.

This allows the FM modulation to operate consistently regardless of changes in overall brightness.

Finally, the signal is white clipped and dark clipped, removing extremely high or extremely low spikes generated as a by–product of the emphasis circuits, thus preventing over–modulation.

This altered video signal is then converted into a frequency modulated signal by the FM modulator inside of IC3.

Then the FM signal is adjusted in it's current by VR9 and sent through a high pass filter network (L13 and C67) and 700kHz trap (C205 and L12), which block the lowest sidebands of the FM signal. This prevents interference when the converted chrominance signal is mixed in the mix circuit (Q28) of the Video Head Amp C.B.A. and fed to the main video heads via the recording amp on the Video Head Amp C.B.A.

2) Luminance Playback circuit

During Playback, the FM signals from the video heads are supplied to IC5001 on the Video Head Amp C.B.A.

While one video head is on the tape, the other head is picking up only noise. To eliminate this noise, the signal from the head which is not contact with the video tape is switched off for that one–half revolution. For the next half revolution, the opposite head is switched off and the first head is switched on.

This is accomplished by the head switching pulse developed on the Servo Circuit and sent to the Head Amp IC, IC5001.

The FM signal from Head Amp (RF signal) appears at pin 15 during playback mode.

On the other hand, SS heads (R′ and R″ heads), which are 70um width, are used in the special playback modes (except shuttle X1 FWD mode which is the same as the normal playback mode.)

This is performed by SS H signal from the Servo circuit.

SS H signal is fed to the Head Amp Circuit and allows to switch R and L heads to R′ and R″ heads.

The signal for luminance playback passes through L.P.F (C5065, 5064 and L5012) on the Video Head Amp C.B.A. and fed to the cosine corrector circuit consisting of DL4, Q53 and 54. This circuit compensates for the frequency without changing the phase characteristic. Next, after chrominance signal is trapped by L22 and C116.

The signal is supplied to the dropout compensator (DOC) inside of IC7, and then its output is fed to the double limitter in IC6 removes all traces of amplitude fluctuation in the FM signal which might be caused by noise pick–up, variations in tape output or tape contact, and the like. After limiting, the FM signal is restored to the video signal by the FM demodulator within IC6.

Then demodulated signal passes through 4MHz LPF (FL4), and is divided into three ways. One is for dubbing output.

This path allows the signal to go through the DUB noise canceller circuit and then go through the delay line to adjust the timing between luminance and chrominance signals, and is connected with the dub output. Another is for composite video output, the last is for luminance signal output. These are both outputted from line output but signal for composite video output should pass through 3MHz L.P.F (FL3 and FL7). This signal is also compensated for its frequency by picture control volume which can be manually controlled and is noise cancelled.

It eliminates excessive spike noise like signal made in the detail enhancer circuit.

As described before, when the input select switch is set to DUB position, the frequency characteristics of the noise canceller circuit is slightly changed to become flat in the picture control circuit. The processed luminance signal is supplied to the luminance and chrominance mix circuit and in the SS mode, the V pulse is also added. The mixed signal is then separated to two output stages.

3) Input Select circuit

As described in general description, the choice of the input select switch enables to let the corresponding signal pass. But when dub position is selected by the input select switch, either dub input or line input is able to pass through the circuit. It is decided by the connection of the dubbing cable. When the dubbing cable is connected and the signals are fed into the circuit, DUB 0V is also supplied to D2 and QR2 and the line input is rejected to pass by the switch (IC1–13), finally the dub signal is allowed to be supplied by IC1–12.

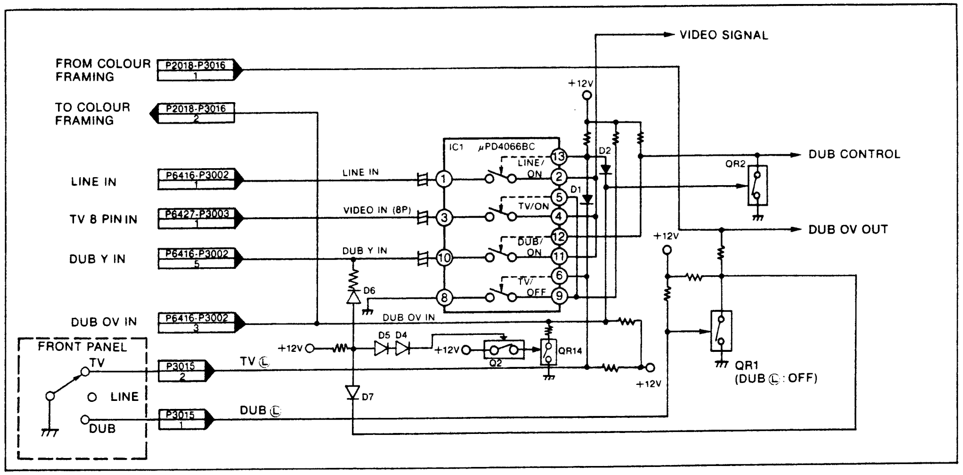


Figure 5—5 Input Select

4) Manual Gain Control circuit

When the video level switch on the Front Panel is set to MAN (MANUAL) position, the gain of the video signal can be adjusted manually by VR6309, but also in this case, the video signal is passed through AGC circuit (IC3). That is to say, video signal is mixed with manually controlled one and fed back to AGC DETECTION circuit to detect the gain by using sync signal.

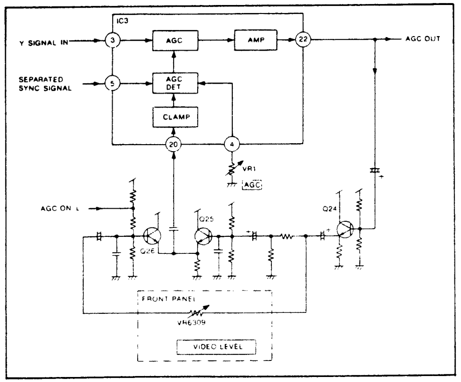


Figure 5—6 Manual Gain Control

5) Detail Enhancer circuit

This circuit is adapted to the Luminance recording circuit.

The Detail Enhancer Circuit emphasizes the incoming luminance signal in accordance with specific characteristics in order to realize the small details in the playback picture.

The characteristics of the Detail Enhancer is shown in Figure 5–7.

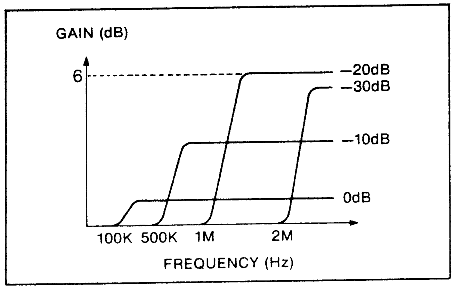


Figure 5—7 Characteristics of the Detail Enhancer

The Detail Enhancer circuit mainly consists of a low pass filter, differential amplifier, suppressor amplifier, clip and mixer circuits.

A simplified block diagram for the Detail Enhancer circuit is show in Figure 5–8.

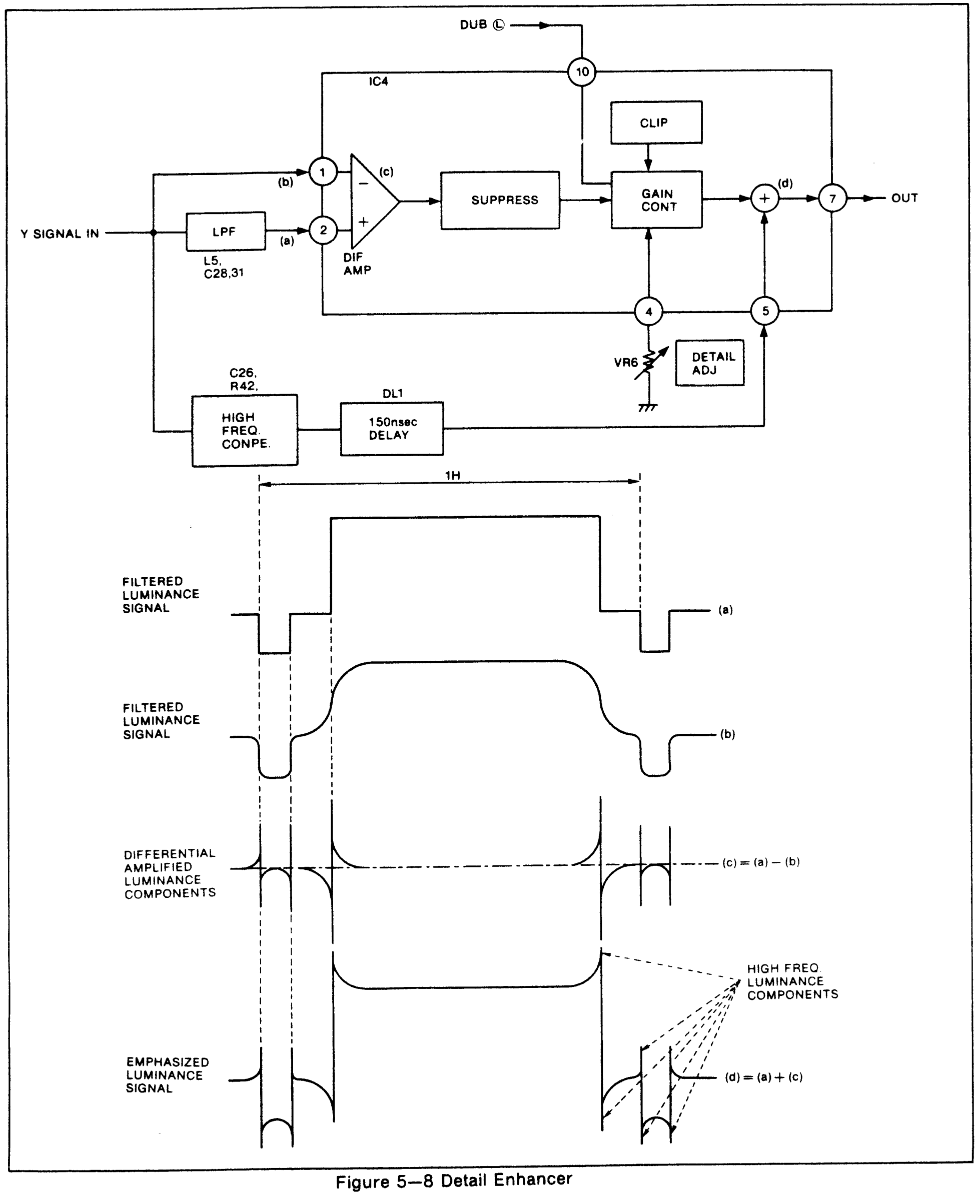

DUB Ⓛ
IC4
10
CLIP
(b)
1
(c)
SUPPRESS
GAIN CONT
(d)
+
7
OUT
Y SIGNAL IN
LPF
(a)
2
L5, C28,31
DIF AMP
4
5
VR6
DETAIL ADJ
C26, R42,
DL1
HIGH FREQ. CONPE.
150nsec DELAY
1H
FILTERED LUMINANCE SIGNAL
(a)
FILTERED LUMINANCE SIGNAL
(b)
DIFFERENTIAL AMPLIFIED LUMINANCE COMPONENTS
(c) = (a) − (b)
HIGH FREQ. LUMINANCE COMPONENTS
EMPHASIZED LUMINANCE SIGNAL
(d) = (a) + (c)

Figure 5–8 Detail Enhancer

In the recording mode, the Luminance signal is split into three paths and fed to the Detail Enhancer circuit. One of the Luminance signal is applied to the MIX circuit through the high frequency compensator (C26, R42) and Delay line (DL1) which delays by 150nsec.
The Delay line (DL1) is especially used to delay the video signal in order to match the timing of the other signals, because it is passed through the low pass filter (L5, C28 and 31) to make a time delay. In this time, another signal is applied to the low pass filter which consists of L5, C28 and C31 having approx. 0.1usec, and fed to pin 2 of IC4. On the other hand, this signal is reflected because this low pass filter is not terminated and mixed with the original signal and fed to pin 1 of IC4.
In this way, the Luminance signal according to the network characteristics produces two signals (a) and (b) as shown in Figure 5–8.
Then, both of them are supplied to the differential amplifier after filtering through the L.P.F. The differential amplifier subtracts the filtered Luminance signal (b) from (a).
As a result, the output signal contains only high frequency Luminance components (c). The high frequency Luminance components are then provided to the suppressor amplifier. The characteristic of input/output for the Suppressor amplifier is shown in Figure 5–9.

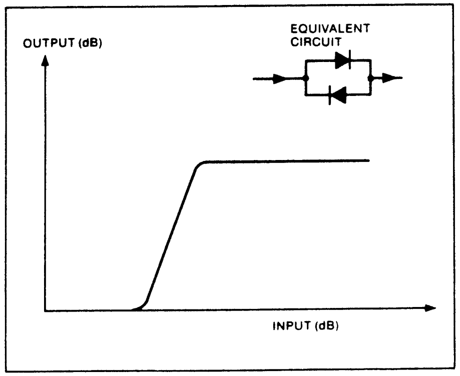


Figure 5– 9 Characteristic of input/output for the Suppressor Amplifier

This Suppressor operates to cancel the noise portion whose gain is around −30dB.
Then the signal whose noise is extracted is applied to the clip circuit to cut off the high frequency Luminance signal to the proper level and is fed to the amplifier. The amplifier determines the emphasis amount, that is controlled by the VR6.

It can also be switched by DUB L signal which is produced from the input select switch.
Then, this signal is fed to the Mix circuit in order to mix with the incoming video signal from the A.G.C, so that it produces an emphasized video signal (d) as shown in Figure 5–8.
After being mixed, the video signal is fed to the Luminance recording process circuit.

6) While Clip circuit

The white clip level has been raised as shown in Figure 5–10 to produce crisper, sharper images.

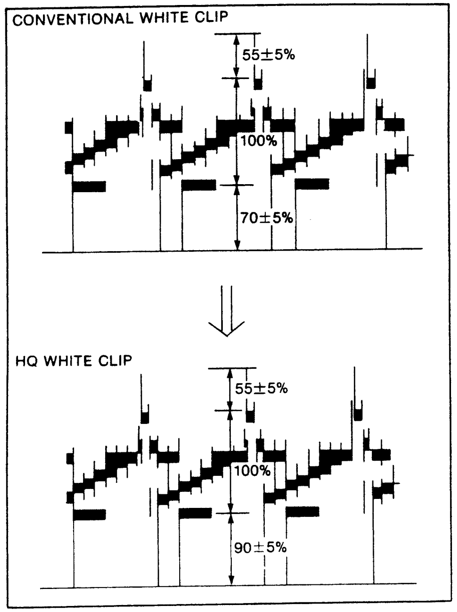

CONVENTIONAL WHITE CLIP
55±5%
100%
70±5%
HQ WHITE CLIP
55±5%
100%
90±5%

Figure 5—10 White Clip

7) Cosine Corrector circuit

This circuit functions as a peaking circuit in order to improve the overall frequency characteristics without changing phase characteristics.
Transistors Q53 and Q54 form a differential amplifier circuit which will produce maximum output when the two inputs supplied to the base of Q53 and Q54 are of opposite phase, and produces minimum output when the two input signals are exactly in phase. The input to Q54 is obtained through delay line DL4 which produces 180 degrees phase shift around 6MHz, resulting in the peaked frequency response shown in Figure 5–11. COS EQ LEVEL control VR15 allows adjustment of the corrector response.

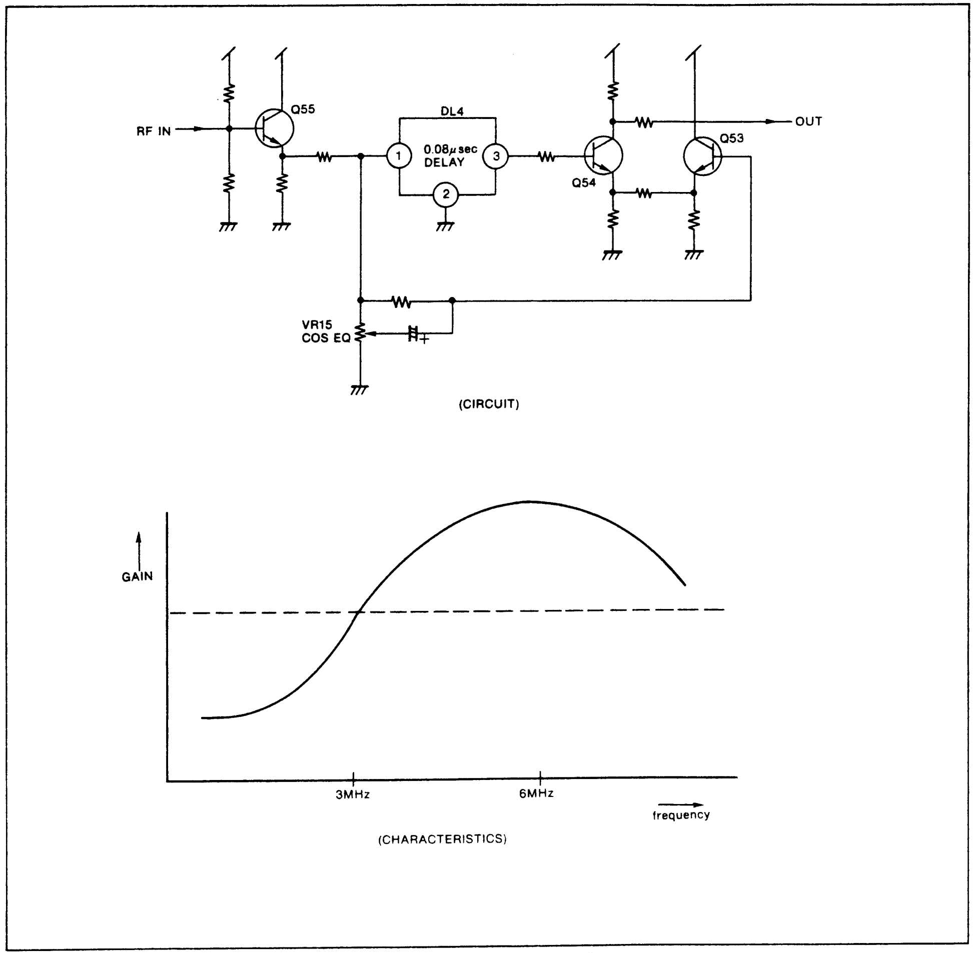

RF IN
Q55
DL4
1
0.08μsec
DELAY
3
2
Q54
Q53
OUT
VR15
COS EQ
(CIRCUIT)
GAIN
3MHz
6MHz
frequency
(CHARACTERISTICS)

Figure 5-11 Cosine Corrector

8) Noise Canceller Circuit

A. Line Correlation Noise Canceller

To increase the S/N ratio of the Luminance signal, this circuit detects the noise components by using a 1H delay line to "correlate" two lines, which are then subtracted, leaving the noise component. This nois is then subtracted from the original signal, increasing the S/N ratio. The fact that the video signal rarely changes greatly from one line to the next accounts for this circuits effectiveness. (Figure 5–12)

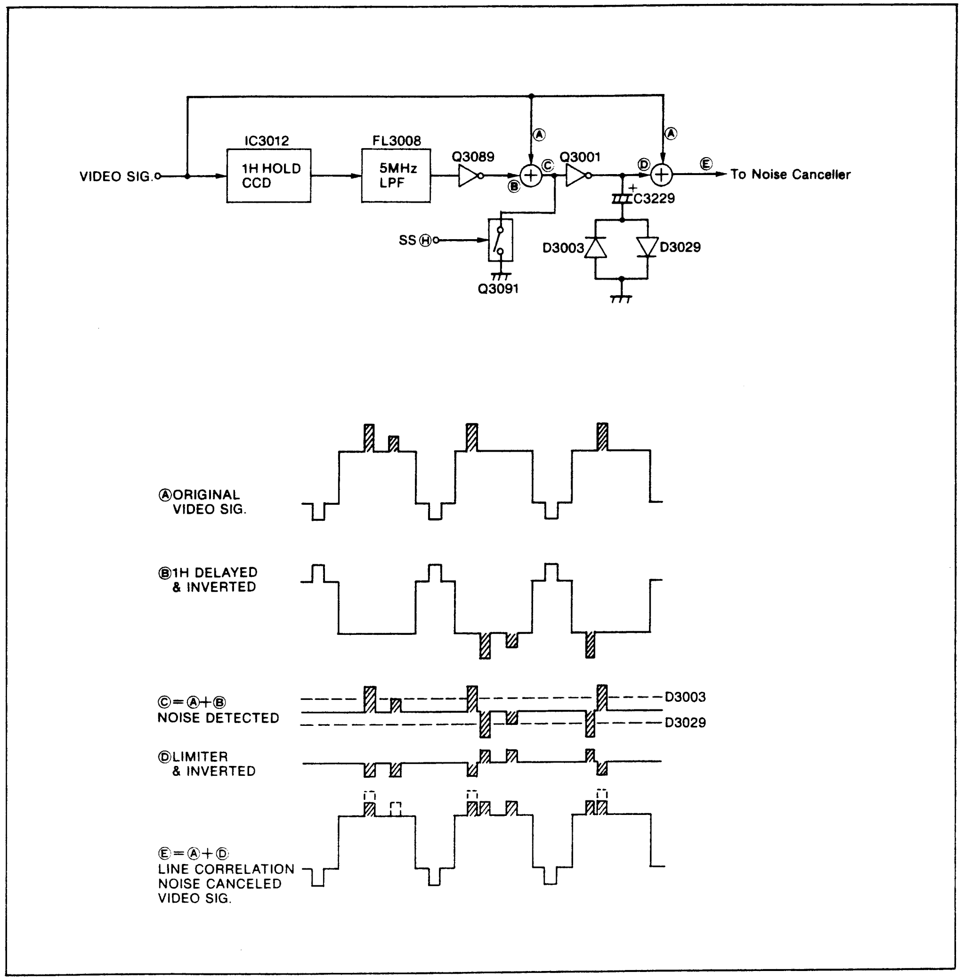

VIDEO SIG.
IC3012
1H HOLD
CCD
FL3008
5MHz
LPF
Q3089
Ⓐ
Ⓑ
Ⓒ
Q3001
Ⓓ
Ⓐ
Ⓔ
To Noise Canceller
C3229
SS Ⓗ
Q3091
D3003
D3029
ⒶORIGINAL VIDEO SIG.
Ⓑ1H DELAYED & INVERTED
Ⓒ=Ⓐ+Ⓑ NOISE DETECTED
D3003
D3029
ⒹLIMITER & INVERTED
Ⓔ=Ⓐ+Ⓓ LINE CORRELATION NOISE CANCELED VIDEO SIG.

Figure 5—12 Line Correlation Noise Canceller

B. Noise Canceller

The Luminance signal which has passed through the Line Correlation Noise Canceller Circuit is input to this Noise Canceller circuit to remove the high frequency noise component. The Luminance signal input to the circuit is first divided into signal (A) which does not pass through the circuit and a signal which is supplied to the INVERTER. The signal whose phase has been inverted at the INVERTER gets its H.P.FT high frequency component removed (B), is applied to the limiter (C) and output with the original signal (A). The inverted high frequency noise component (C) is removed here by correlating with the original signal (A), but at the same time the rise, fall and other high frequency components of the original signal are removed somewhat. The signal to correct this is removed by D3019, D3020 (D), and added to the original signal (A).

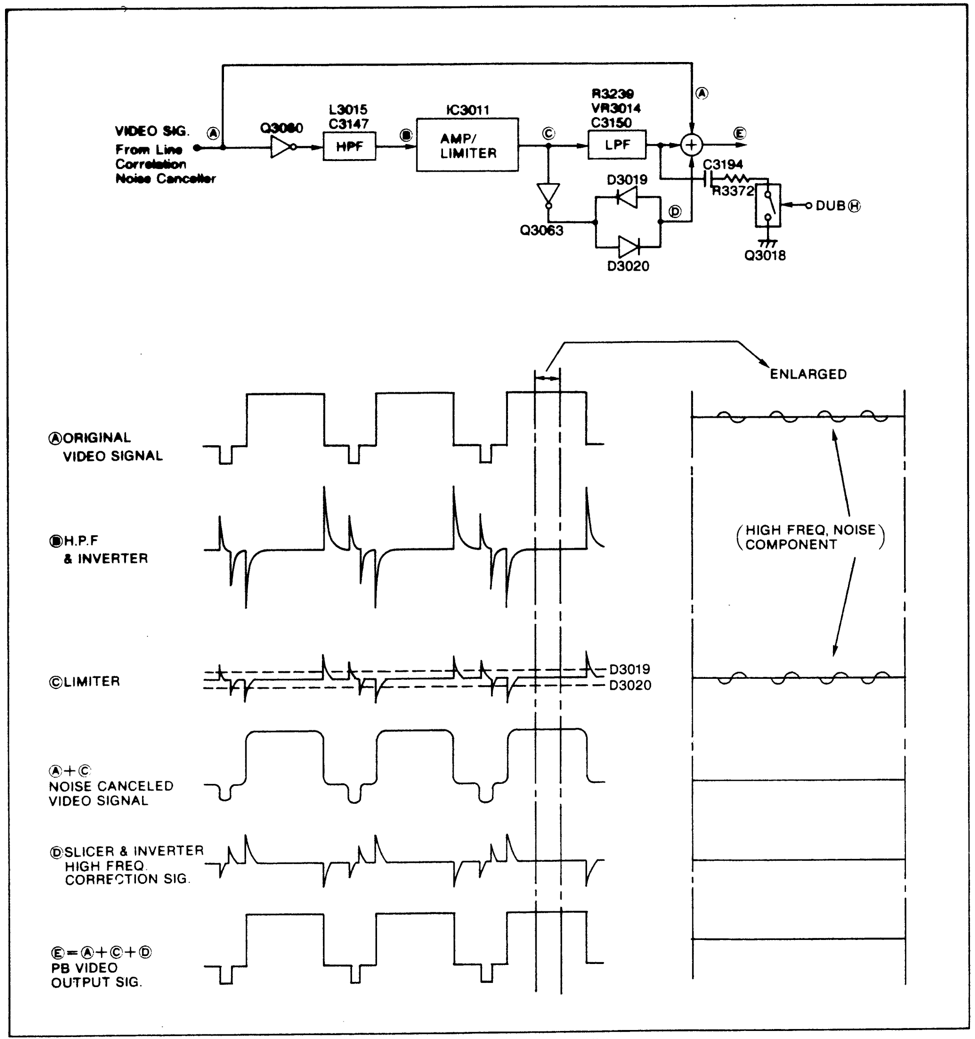


Figure 5—13 Noise Canceller

5–3. CHROMINANCE SECTION
(REF. NO. 8000 SERIES)

1) Chrominance Recording circuit

The entire video signal is also sent to a Band Pass Filter (FL 1) in order to extract the chrominance portion.
The chrominance signal is then fed to the Automatic Chroma Gain Control (ACC) circuit within IC1 which automatically adjusts the amplitude of the chrominance signal by measuring the amplitude, and amplifying or attenuating the entire chrominance signal until the burst amplitude is correct.
After the chrominance signal has been set to its proper level by the ACC, the signal converted in frequency from the region of 4.43MHz to the region of 627kHz with colour phase rotation.
This is accomplished by sending the chrominance signal along with a 5.06MHz with colour phase rotation signal to the two inputs of a main balanced modulator within the same IC.
The 5.06MHz with colour phase rotation signal is produced by the Automatic Frequency Control (AFC) and color phase rotation circuit within IC 1 and 2.
The output of the main balanced modulator contains both the frequency sum and difference of the two input signals. The frequency difference is 627kHz with phase rotation, and this desired portion is extraced by the Low Pass Filter (FL 5), eliminating the frequency sum portion (9.49MHz).
On the other hand, the down–converted 627kHz chrominance signal with colour phase rotation is fed from dubbing input with dubbing head switching signal in the dub input mode, passes through the phase rotation control circuit which corrects the relationship between the field and the phase rotation.
This 627kHz with phase rotation chrominance signal is then controlled by VR3 or VR5 in the current, and sent to the mix circuit (Q5028) on the Video Head Amp C.B.A.
The chrominance and Luminance Signal is sent to the video heads.

2) Chrominance Playback circuit

The Chrominance signal from the Head Amplifier on the Video Head Amp C.B.A. is the input for the chrominance playback circuit. Since the chrominance information was down–converted to a frequency band centered at 627kHz, the chrominance information is extracted from the FM (luminance) signal by passing through a low pass filter (FL5001) whose upper cut–off frequency is approximately 1.5MHz. This chrominance only signal is then corrected in the differencial gain by the Differencial Gain Correction circuit (Q6), and sent to an ACC (Automatic Chroma Gain Control) circuit within IC3. Its purpose is the same as the ACC circuit on Record mode, which is to control the gain so as to reestablish the chrominance signal to its proper level. This is accomplished by taking the signal after it is re–converted to 4.43MHz signal.
Next the signal is re–converted back up to the frequency band centered at 4.43MHz, so that it conforms to PAL standards and a conventional monitor can utilize the chrominance information.
This is the basic function of the chrominance playback section and the one which requires most of the circuitry. The frequency reconversion is accomplished by balance–modulating the incoming (627kHz) signal with a generated 5.06 MHz with phase rotation signal. In the case of the frequency conversion during record, the main balanced modulator (within IC3) produces an output which contains both the sum and the difference of the two input frequencies. For a balanced modulator, the input frequencies themselves are completely suppressed. In this case the difference portion of the balanced modulator output (4.43MHz) is desired, as opposed to the sum portion (5.69MHz). The 4.43MHz portion is extracted by sending the main balanced modulator output through a 4.43MHz band pass filter (FL3).
This is the basic system for re–conversion of the chrominance signal.
Unfortunately the signal from the video heads during playback contains a certain amount of time–base instability or jitter, which renders the chrominance signal unacceptable because it would cause constant hue shifting in the monitor. This jitter is caused by a number of factors such as erratic movement of the video tape around the head cylinder and posts, and stretch and contraction of the video tape. Actually the frequency of the chrominance signal during playback is centered at 627kHz + delta f, where delta f represents the jitter component. In order to eliminate this delta f component, the generator which produces the 5.06MHz signal must detect the delta f component and generate not 5.06MHz, but 5.06MHz + delta f, where is delta f also corresponds to the jitter from the playback signal. delta f signal is detected by phase comparator, in which the phase between playback 4.43MHz signal and 4.43MHz oscillated in X'tal VCO is comparated, and the voltage corresponding to the phase difference is supplied to VCO which generates 627kHz. And 627kHz is sent to phase rotation circuit, finally 627kHz + delta f signal with phase rotation and 4.43MHz oscillated by X'tal VCO generates 5.06MHz + delta f signal with phase rotation in sub balanced modulater.
If this is done, both inputs to the balanced modulator contain a delta f component and output signal used is the difference (4.43MHz).

Notice that the difference portion of the balanced modulator output the delta f component is cancelled out (delta f=0), and therefore a chrominance signal centered at 4.43MHz without any jitter factor is obtained. The cancellation of the jitter factor depends upon accurately making the 5.06MHz + delta f signal with phase rotation.
The playback process also causes some phase errors. These phase errors are cancelled in the same fashion by adding phase error to the 5.06MHz + delta f, which will cancel in the balanced modulator.
After the chrominance signal is reconverted to 4.43MHz without jitter and without phase error, the signal is then sent to the comb filter consisted of the 2H delay line which eliminate the colour crosstalk in DL7 the signal is then amplified by IC8.
Then 4.43MHz chrominance signal is supplied to DL3005, Q3084, 3085, 3086, 3087, and 3088, the Recursive circuit on the Video circuit, which improves the chrominance signal to noise ratio by eliminating the crosstalk. In the Dub input mode on the Front Panel, this circuit is cancelled.
Next the signal is mixed by the mix circuit (Q3071).
On the other hand, down–converted chrominance signal passing through the ACC circuit is fed out to the Dubbing cable as dubbing chrominance signal.

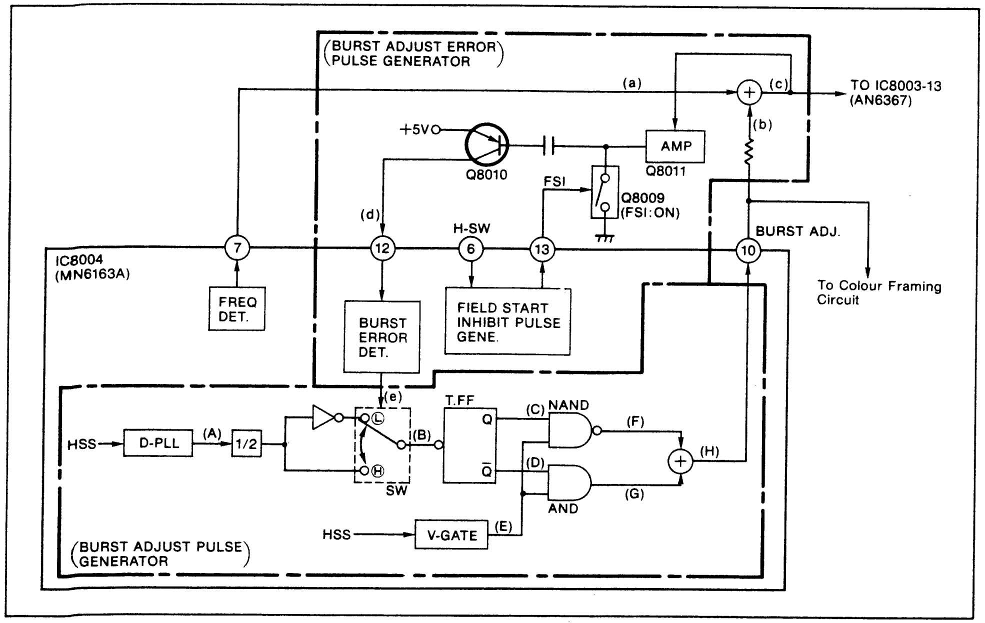

BURST ADJUST ERROR PULSE GENERATOR
(a)
(c)
(b)
TO IC8003-13 (AN6367)
+5V
Q8010
AMP
Q8011
FSI
Q8009 (FSI:ON)
(d)
H-SW
BURST ADJ.
IC8004 (MN6163A)
7
12
6
13
10
To Colour Framing Circuit
FREQ DET.
BURST ERROR DET.
FIELD START INHIBIT PULSE GENE.
(e)
T.FF
Q
Q̄
(C) NAND
(F)
(D)
(H)
HSS
D-PLL
(A)
1/2
(B)
SW
AND
(G)
HSS
V-GATE
(E)
BURST ADJUST PULSE GENERATOR

Figure 5—14 Burst Adjust Pulse Generating Circuit Block Diagram

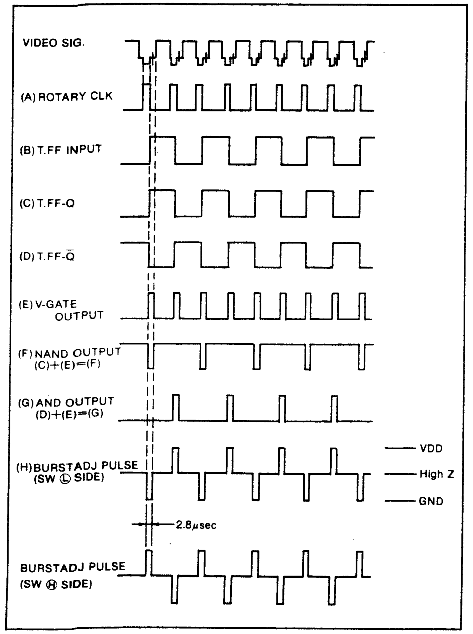

VIDEO SIG.
(A) ROTARY CLK
(B) T.FF INPUT
(C) T.FF-Q
(D) T.FF-Q̄
(E) V-GATE OUTPUT
(F) NAND OUTPUT (C)+(E)=(F)
(G) AND OUTPUT (D)+(E)=(G)
(H) BURSTADJ PULSE (SW Ⓛ SIDE)
VDD
High Z
GND
2.8μsec
BURSTADJ PULSE (SW Ⓗ SIDE)

Figure 5—15 Burst Adjust Pulse Generator

3) Burst Adjust Pulse Generating Circuit

This Chrominance circuit performs jitter correction with an APC loop during PB. However, since the PAL burst signal swings +– 45 every 1H, the 5.02MHz VCO frequency is oscillated every 1H. The Burst Adjust Pulse Generating Circuit serves to correct this.

A. Burst Adjust Pulse Generator (Figure 5–15)

For D–PLL during PB, PB HSS is input from P8002–7, and ROTARY CLK (A) is output. This signal is made from HSS, and so the signal has the same phase as PB VIDEO SIG. H-SYNC. This signal is divided in half and input to T.FF. For the 1/2 ROTARY CLK (B) input to T.FF, signals are output in the same phase as input from Q and in the inverse phase from Q. T.FF~Q (C) is input to a NAND circuit and T.FF–Q (D) to an AND circuit. V–GATE OUTPUT (E) is input to the other terminals of the NAND and AND circuits. When both of the 2 inputs are (H), the NAND circuit outputs (F) and the AND circuit (G). The mixture of those 2 signals is output from IC8004–10 as Burst adjust Pulse.

B. Burst Adjust Error Pulse Generator (Figure 5–16)

The phase of the PAL burst signal swings +– 45 degrees every 1H, and so the output of the 5.02MHz FREQUENCY DET. is (H) when the burst signal is –45 degrees and (L) when +45 degrees, as in (a). The Burst Adjust Pulse serves to correct this, but if the FREQ. DET output happens to take the same phase as the Burst Adjust Pulse, the form will emphasise the FREQ. DET output. The purpose of this circuit is to detect such errors and make sure that Burst Adjust Pulse has inverse phase of FREQ. DET output. For example, suppose that now the FREQUENCY DET. output (a) and the Burst Adjust Pulse (b) have the same phase. Their mixture signal IC8003–13 INPUT SIG will be like (c). then the output of Q10 will be (d) Burst Adjust Error Pulse, and will be input to Burst Error DET. In the Burst Error DET, the number of Burst Adjust Error Pulse is counted in a 16H reading period asynchronous with other signals. If the count is 6 or greater, it is judged an error, the Burst Error DET. output (e) is inverted and the SW in the Burst Adjust Pulse Generator is switched. This results in inversion of Burst Adjust Pulse phase, and conversion to the correct signal of FREQ. DET output.

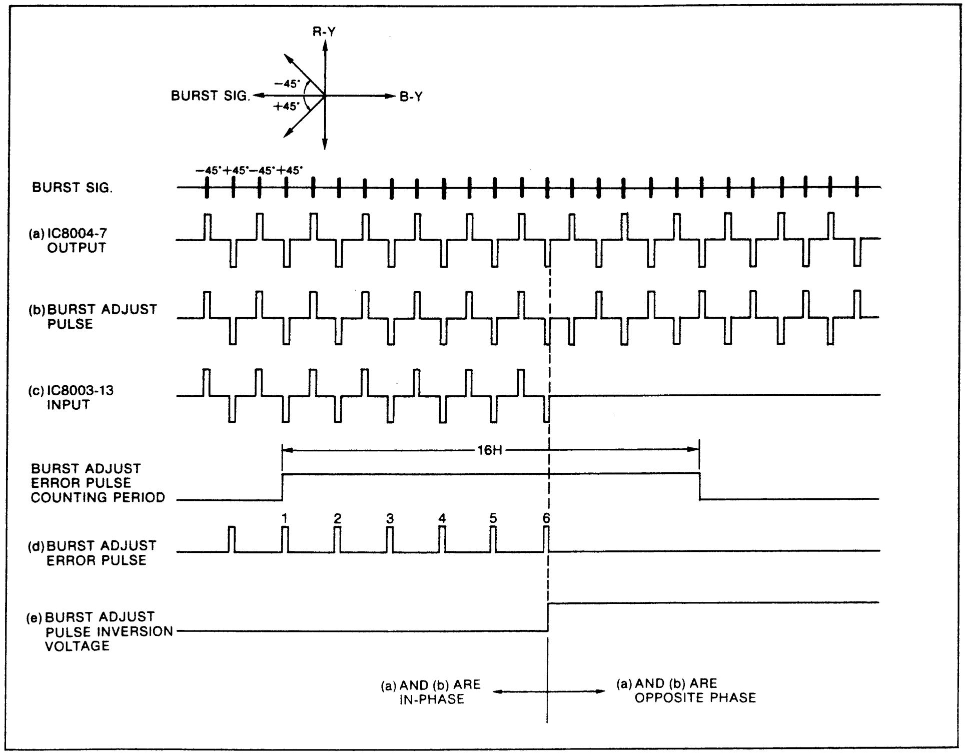

R-Y
BURST SIG.
–45°
+45°
B-Y
–45°+45°–45°+45°
BURST SIG.
(a) IC8004-7 OUTPUT
(b) BURST ADJUST PULSE
(c) IC8003-13 INPUT
16H
BURST ADJUST ERROR PULSE COUNTING PERIOD
1
2
3
4
5
6
(d) BURST ADJUST ERROR PULSE
(e) BURST ADJUST PULSE INVERSION VOLTAGE
(a) AND (b) ARE IN-PHASE
(a) AND (b) ARE OPPOSITE PHASE

Figure 5—16 Burst Adjust Error Pules Generator

4) Recursive circuit (on the Video C.B.A.)

The method developed to obtain the better comb characteristic for improvement of chrominance signal to noise ratio is the Recursive Filter. The recursive filter circuit consists of the loop circuits including the 1H delay line as shown in Figure 5–17.
Playback colour signal is delayed by 1H being fed to 1H Delay Line (DL5), mixed (subtracted by means of the characteristics of the PAL color signal) with the original one, and noise components are detected.
These components are inverted by Q86 and passed through the limiter (D21 and 22). Noise is finally cancelled when limited, inverted noise components are added to the original signal. Also these noise components are fed back to the input of the delay line and mixed with the original signal and the same way is also performed. Finally noise is decreased in it's gain regardless of the noise which is correlative or not by 1H, is averaged in several H lines and is put in a quiet way.

In this recusive filter circuit, the needless signal component is more suppressed in comparison with the conventional comb filter, as the result the chrominance signal to noise ratio is improved.

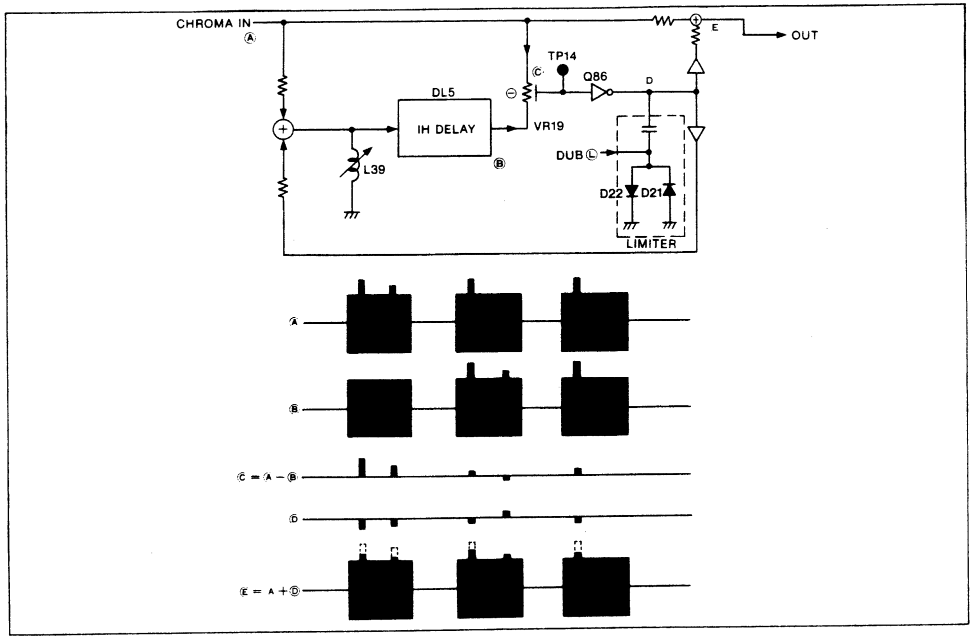

CHROMA IN
Ⓐ
E
OUT
TP14
Ⓒ
Q86
D
DL5
IH DELAY
VR19
Ⓑ
DUB Ⓛ
L39
D22
D21
LIMITER
Ⓐ
Ⓑ
Ⓒ = Ⓐ − Ⓑ
Ⓓ
Ⓔ = A + Ⓓ

Figure 5—17 Recursive

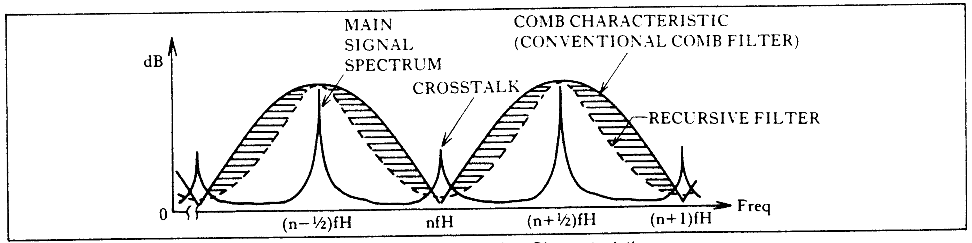


Figure 5—18 Recursive Characteristics

6. Audio Section

Introduction

The AG–6500 has four channels to work with–two Hi–fi audio channels and two normal audio cahnnels. The AG–6500 is equipped with complete input and output connectors, level controls, and metering facilities to handle each channel independently, all at once, or any combination in between. On the rear panel, there are separate CH1 and CH2 input connectors for normal and HD (Hi–Fi) recording. If the HD connectors are not acive, the signal to the normal connectors will be routed automatically to the HD recording circuitry.

The front panel CH1 and CH2 level meters can be switched for indication of either type of input signal. The recording level is adjustable by coaxial friction coupled knobs for the CH1 and CH2. Dolby NR circuitry can be switched on to improve normal audio signal.

6–1. Audio Input Select Circuit

Depending on how the input connections are made to the normal audio input jacks and the HD (Hi–Fi) audio input jacks, the audio signal application will change as shown in Figures 6–1, 6–2, 6–3.

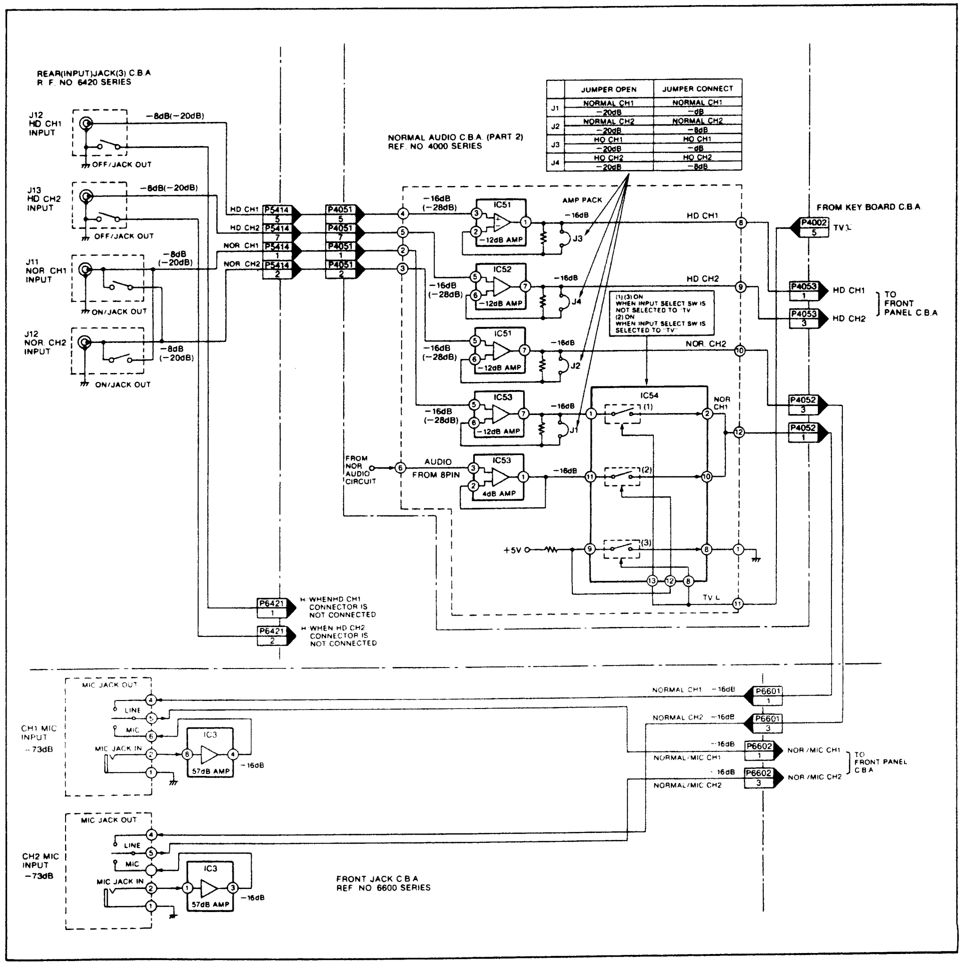

REAR(INPUT)JACK(3) C.B.A
R. F. NO 6420 SERIES
J12
HD CH1
INPUT
−8dB(−20dB)
OFF/JACK OUT
J13
HD CH2
INPUT
−8dB(−20dB)
OFF/JACK OUT
J11
NOR CH1
INPUT
−8dB
(−20dB)
ON/JACK OUT
J12
NOR. CH2
INPUT
−8dB
(−20dB)
ON/JACK OUT
HD CH1
HD CH2
NOR CH1
NOR CH2
P5414
P4051
NORMAL AUDIO C.B.A. (PART 2)
REF. NO 4000 SERIES
JUMPER OPEN
JUMPER CONNECT
J1
NORMAL CH1
−20dB
NORMAL CH1
−dB
J2
NORMAL CH2
−20dB
NORMAL CH2
−8dB
J3
HD CH1
−20dB
HD CH1
−dB
J4
HD CH2
−20dB
HD CH2
−8dB
AMP PACK
−16dB
(−28dB)
IC51
IC52
IC53
−12dB AMP
−16dB
HD CH1
HD CH2
NOR. CH2
J3
J4
J2
J1
(1)(3) ON
WHEN INPUT SELECT SW IS
NOT SELECTED TO "TV"
(2) ON
WHEN INPUT SELECT SW IS
SELECTED TO "TV"
IC54
NOR
CH1
FROM
NOR
AUDIO
CIRCUIT
AUDIO
FROM 8PIN
4dB AMP
+5V
TV L
FROM KEY BOARD C.B.A.
P4002
TV L
P4053
HD CH1
HD CH2
TO
FRONT
PANEL C.B.A
P4052
P6421
H: WHENHD CH1
CONNECTOR IS
NOT CONNECTED
H: WHEN HD CH2
CONNECTOR IS
NOT CONNECTED
MIC JACK OUT
LINE
MIC
MIC JACK IN
CH1 MIC
INPUT
−73dB
CH2 MIC
INPUT
−73dB
IC3
57dB AMP
−16dB
NORMAL CH1 −16dB
NORMAL CH2 −16dB
P6601
P6602
NORMAL/MIC CH1
NORMAL/MIC CH2
NOR./MIC CH1
NOR./MIC CH2
TO
FRONT PANEL
C.B.A
FRONT JACK C.B.A
REF. NO 6600 SERIES

Figure 6—1 Input Select Circuit

A. When the Phono Plug is connected to the HD audio input connectors, the jack in/out switch inside of connector is closed. Then the low signal is applied to switching IC (IC6301) of the Front Panel C.B.A. and the HD Audio signal is applied to the HD Audio C.B.A. via IC6301.
When the Phono Plug is not connected to the HD Audio input connectors, the high signal is applied to IC6301 and the Normal or Mic Audio signal is applied to the HD Audio C.B.A. via IC6301 as shown in Figure 6-3.

B. When the Phono Plug is not connected to the Normal audio channel 1 input connector, the jack in/out switch inside of connector is closed. Then supplied channel 2 audio signal is sent to the Normal audio channel 1 recording circuit.
When the Phono Plug is not connected to the Normal audio channel 2 input connector, supplied channel 1 audio signal is sent to the channel 2 recording circuit as shown in Figure 6-3.

C. There are four audio select switches on the Key Board C.B.A.
The audio monitor, Meter, input signal and HD recording are selected by these switches as shown in Figure 6-2.
And the control signal is applied to the Normal audio C.B.A.

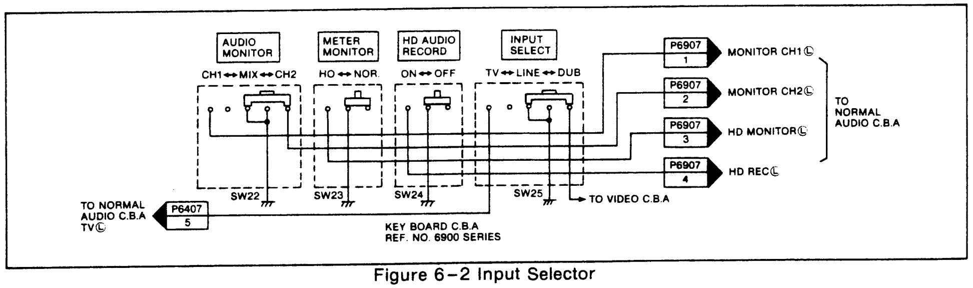

AUDIO MONITOR
METER MONITOR
HD AUDIO RECORD
INPUT SELECT
CH1↔MIX↔CH2
HO↔NOR.
ON↔OFF
TV↔LINE↔DUB
SW22
SW23
SW24
SW25
P6907 1
MONITOR CH1Ⓛ
P6907 2
MONITOR CH2Ⓛ
P6907 3
HD MONITORⓁ
P6907 4
HD RECⓁ
TO NORMAL AUDIO C.B.A
TO VIDEO C.B.A
TO NORMAL AUDIO C.B.A TVⓁ
P6407 5
KEY BOARD C.B.A
REF. NO. 6900 SERIES

Figure 6-2 Input Selector

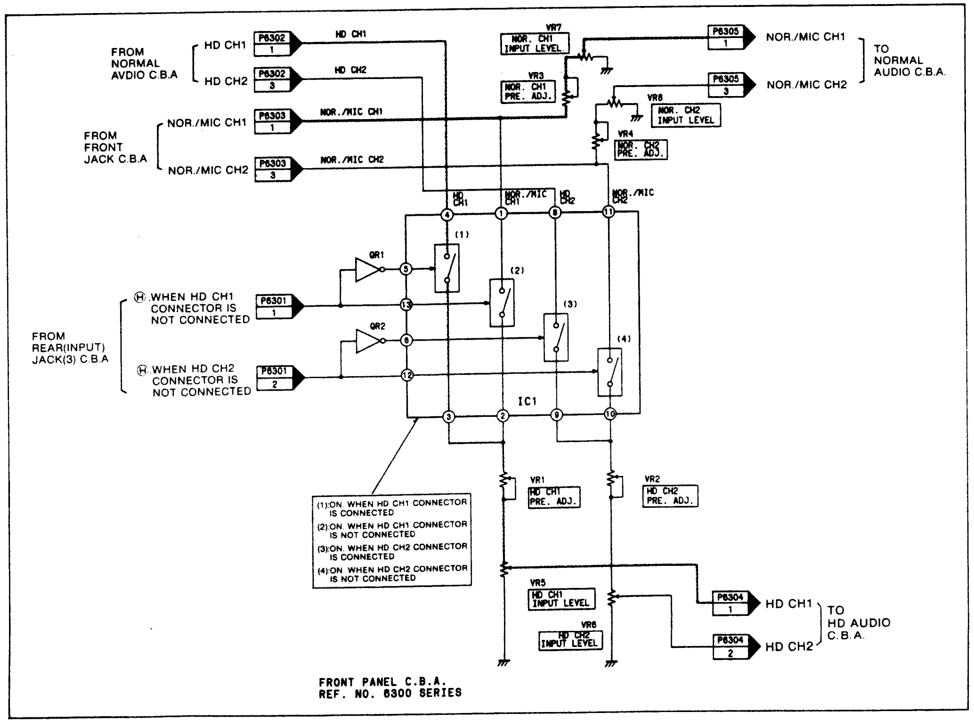

FROM NORMAL AVDIO C.B.A
HD CH1
HD CH2
P6302 1
P6302 3
FROM FRONT JACK C.B.A
NOR./MIC CH1
NOR./MIC CH2
P6303 1
P6303 3
VR7
NOR. CH1 INPUT LEVEL
VR3
NOR. CH1 PRE. ADJ.
VR8
NOR. CH2 INPUT LEVEL
VR4
NOR. CH2 PRE. ADJ.
P6305 1
P6305 3
NOR./MIC CH1
NOR./MIC CH2
TO NORMAL AUDIO C.B.A.
HD CH1
NOR./MIC CH1
HD CH2
NOR./MIC CH2
QR1
QR2
FROM REAR(INPUT) JACK(3) C.B.A
Ⓗ.WHEN HD CH1 CONNECTOR IS NOT CONNECTED
Ⓗ.WHEN HD CH2 CONNECTOR IS NOT CONNECTED
P6301 1
P6301 2
IC1
(1):ON. WHEN HD CH1 CONNECTOR IS CONNECTED
(2):ON. WHEN HD CH1 CONNECTOR IS NOT CONNECTED
(3):ON. WHEN HD CH2 CONNECTOR IS CONNECTED
(4):ON. WHEN HD CH2 CONNECTOR IS NOT CONNECTED
VR1
HD CH1 PRE. ADJ.
VR2
HD CH2 PRE. ADJ.
VR5
HD CH1 INPUT LEVEL
VR6
HD CH2 INPUT LEVEL
P6304 1
P6304 2
HD CH1
HD CH2
TO HD AUDIO C.B.A.
FRONT PANEL C.B.A.
REF. NO. 6300 SERIES

Figure 6-3 Phono Plug Circuit

HD CH1. CH2/ NOR. CH1. CH2 INPUT		INPUT LEVEL VR	LEVEL METER	HD CH1. CH2/ HD NOR. CH1.CH2 OUTPUT	
J4001. 4002 4003. 4004 (CONNECT)	−8dB	FIXED POSITION	"0"	J6401. 6402 6403. 6404 (CONNECT)	−8dB
J4001. 4002 4003. 4004 (OPEN)	−20dB	FIXED POSITION	"0"	J6401. 6402 6403 (OPEN)	−6dB

Figure 6—4 Input Level

dB	Vrms	Vp-p
−28	0.04	0.11
−20	0.1	0.28
−16	0.16	0.45
−8	0.398	1.13
−6.7	0.46	1.3
−6	0.5	1.42
0	1	2.83

Figure 6—5 dB-Vrms-Vp-p

6-2. Normal Audio Recording Process

The Normal audio circuit is used for either during record or playback, and consists of identical circuitry for each of the two channels. Since the two channel are the same, the description will apply to either channel but only channel 1 components will be identified in this section.

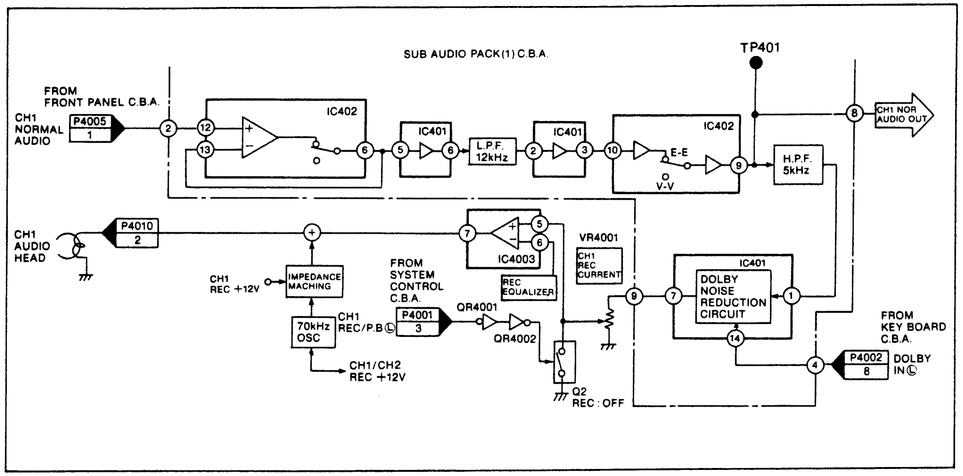

SUB AUDIO PACK(1) C.B.A.
TP401
FROM FRONT PANEL C.B.A.
CH1 NORMAL AUDIO
P4005 1
IC402
IC401
L.P.F. 12kHz
IC401
IC402
E-E
V-V
H.P.F. 5kHz
CH1 NOR AUDIO OUT
CH1 AUDIO HEAD
P4010 2
IC4003
VR4001
CH1 REC CURRENT
REC EQUALIZER
CH1 REC +12V
IMPEDANCE MACHING
70kHz OSC
CH1 REC/P.BⓁ
CH1/CH2 REC +12V
FROM SYSTEM CONTROL C.B.A.
P4001 3
QR4001
QR4002
Q2 REC : OFF
IC401
DOLBY NOISE REDUCTION CIRCUIT
FROM KEY BOARD C.B.A.
P4002 8
DOLBY INⓁ

Figure 6—6 Overall Block Diagram of Normal Audio

1) Line Amp and Level Control

This description will apply to all channel, Normal CH1, Normal CH2, HD CH1 and HD CH2.
The input audio signal from P4051-1 is applied to the line amplifier, IC4053-5, and the output signal at IC4053-7 is sent to the Mic Jack on the Front Jack C.B.A. Then sending normal audio signal is switched to the mic signal or line signal by switch of the mic jack. The switched signal is applied to connector P6303 of the Front Panel C.B.A. and to the Normal audio CH1 pre-adj. control VR6303 inside of unit and the Normal audio CH1 input level control on the front panel and then sent to the Normal Audio Section through connector P6305-1 as shown in Figure 6-1 and 6-3.

2) Preamplifier

IC402 is used for both recording and playback. The voltage of Pin 7 determines the recording or playback mode status of the unit.

If the original signal came from microphone jack, the signal has been amplified, and the level-controlled signal is sent to the preamplifier inside of IC402, then to the DOLBY circuit (encoder).

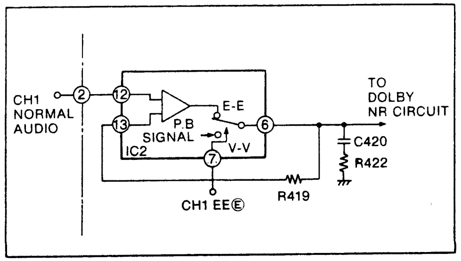

CH1 NORMAL AUDIO
IC2
E-E
P.B SIGNAL
V-V
TO DOLBY NR CIRCUIT
C420
R422
R419
CH1 EEⒺ

Figure 6—7 Preamplifier

3) Audio Limiter (AGC)

A Limiter ON Low signal is fed to the base of QR4017 from the audio limiter switch on the front panel. QR4017 turns OFF for the audio limiter to be activated. The Monitor Out signal from Pin 9 of IC402 is fed to the detection circuit.
The signal level is converted to a proportional DC voltage by Q402, Q403 and other components, and fed to the base of Q401. The output of Q401 is applied (via pin 12 of IC402) as a level control voltage to the Record amplifier in IC402. When the limiter switch is in the position, QR417's open collector grounds any signal going to the AGC stage (Q401, 402, 403) and the limiting action is disabled. In this mode of operation, the signal level at IC402, pin 12 is controlled only by the front panel level control as shown in Figure 6-8.

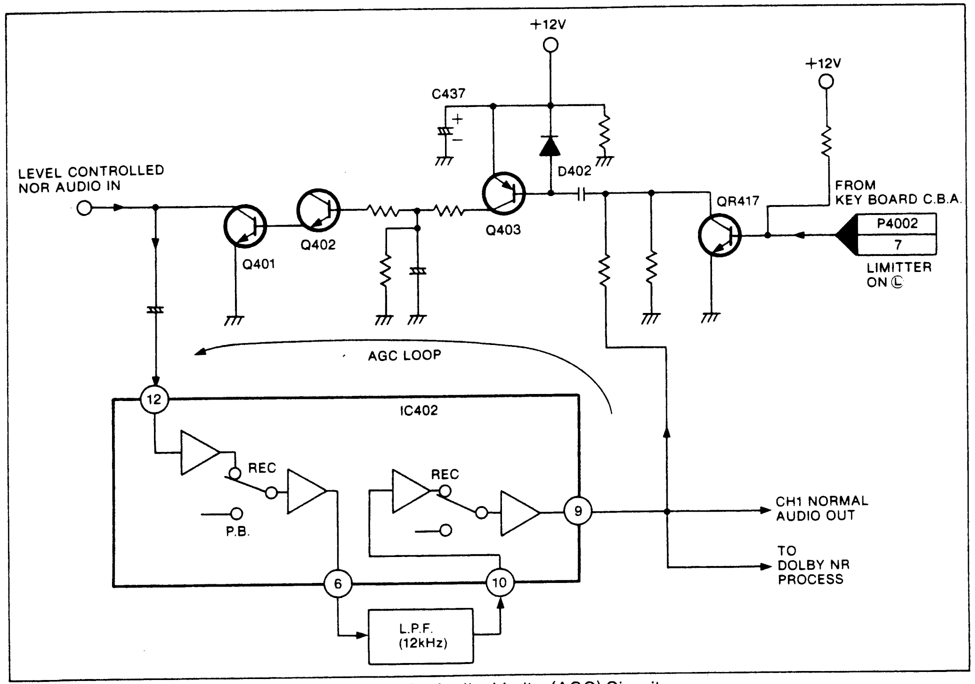

+12V
+12V
C437
D402
LEVEL CONTROLLED
NOR AUDIO IN
Q401
Q402
Q403
QR417
FROM
KEY BOARD C.B.A.
P4002
7
LIMITTER
ON ©
AGC LOOP
12
IC402
REC
REC
P.B.
9
6
10
CH1 NORMAL
AUDIO OUT
TO
DOLBY NR
PROCESS
L.P.F.
(12kHz)

Figure 6—8 Audio Limiter(AGC) Circuit

4) Dolby NR circuit (encorder)

IC401 is a Dolby NR processor used for both recording (encode) and playback (decode). The Dolby NR encode circuit is shown in Figure 6-9. The preamplified signal output from Pin 6 of IC402 is supplied to the amplifier (A) between Pins 5 and 6 of IC401. Any 15.625kHz horizontal sync signal or the 70kHz audio bias signal or other high frequency signals) are eliminated by the low Pass Filter (L401, Dolby NR filter), to allow the Dolby NR circuit to function properly.
The signal (whose high frequency portions are eliminated) is supplied to the amplifier (B) between pins 2 and 3, then supplied to one input of the adder (E) inside IC401, and also exits at pin 3 to be supplied to the amplifier between Pin 10 and Pin 9 inside IC402.

The low frequency portions of the amplified signal are then eliminated by the high pass filter consisting of C407, C408, C412 and R427 and then sent to Pin 1 of IC401.
This signal is supplied to the variable impedance (F). This variable impedance (F) is controlled by a DC voltage converted from the incoming signal level. The DC voltage is produced by the rectifier (G) through the amplifiers (C) and (D).
If the voltage is low, the gain of the variable impedance (F) is increased, while if it is high, the gain is decreased resulting in a controlled amplitude signal. Any remaining amplitude peaks are clipped by the limiter circuit. A high DC voltage (+12V) is supplied to Pin 14 of IC401 whenever Dolby NR processing is not selected.
The gain-controlled signal, which is the high frequency portion of the original signal, is supplied to the other input of the adder (E). The two input signals are then mixed and phase inverted (See Figure 5-10 and 5-11). The resulting encoded output signal is sent out from Pin 7 of IC401 and supplied to the audio head.

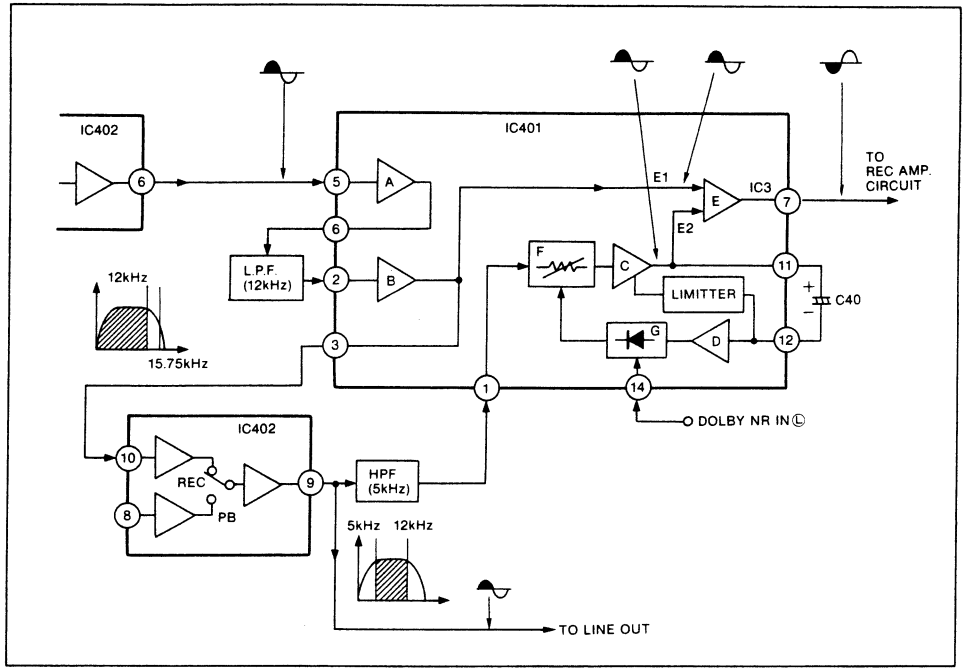

IC402
6
IC401
5
A
6
L.P.F.
(12kHz)
2
B
3
12kHz
15.75kHz
E1
E
IC3
7
E2
TO
REC AMP.
CIRCUIT
F
C
11
LIMITTER
C40
G
D
12
1
14
DOLBY NR IN©
IC402
10
REC
9
8
PB
HPF
(5kHz)
5kHz 12kHz
TO LINE OUT

Figure 6—9 DOLBY NR System

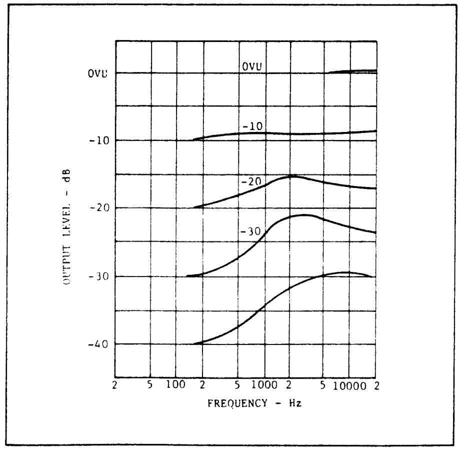


Figure 6—10 Dolby NR System
(REC:Encode Mode)

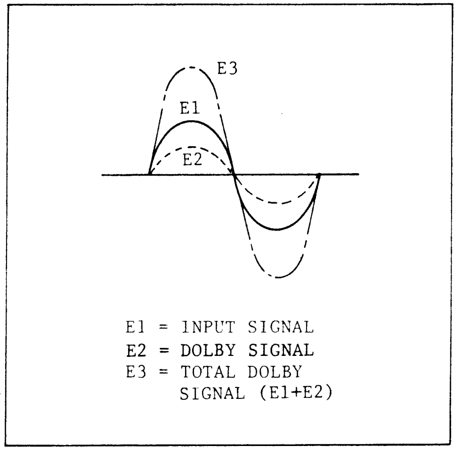

E3
E1
E2
E1 = INPUT SIGNAL
E2 = DOLBY SIGNAL
E3 = TOTAL DOLBY
SIGNAL (E1+E2)

Figure 6—11 Signal Function of DOLBY Encoder

5) Peaking

The signal after Dolby-B NR processed, or non-processed is controlled by VR4001, CH1 REC CURRENT, and then is sent to pin 5 of IC4003, the noninverting input of an operational amplifier (Figure 6-12). The gain of the recording frequency is shown in Figure 6-13.
C4007, 4008, 4009, L4007, R4015, 4016, represent high frequency peaking and R4017 represents low frequency peaking. The total peaking characteristics of the recording frequency is shown in Figure 6-13.

6) Bias and Erase Oscillator

A 70kHz signal is also developed on the normal audio C.B.A. by oscillator Q4005, 4006 and T4001. The oscillator is turned on for the full record mode, or after audio recording for CH1.
The oscillator signal at T4001 is sent to the CH1 audio erase head through the impedance matching circuit.
The full erase head also reseives the sine wave signal from the oscillator Q4005, 4006 and T4001 through the impedance matching circuit (T4002, Q4008) as shown in Figure 6-12.

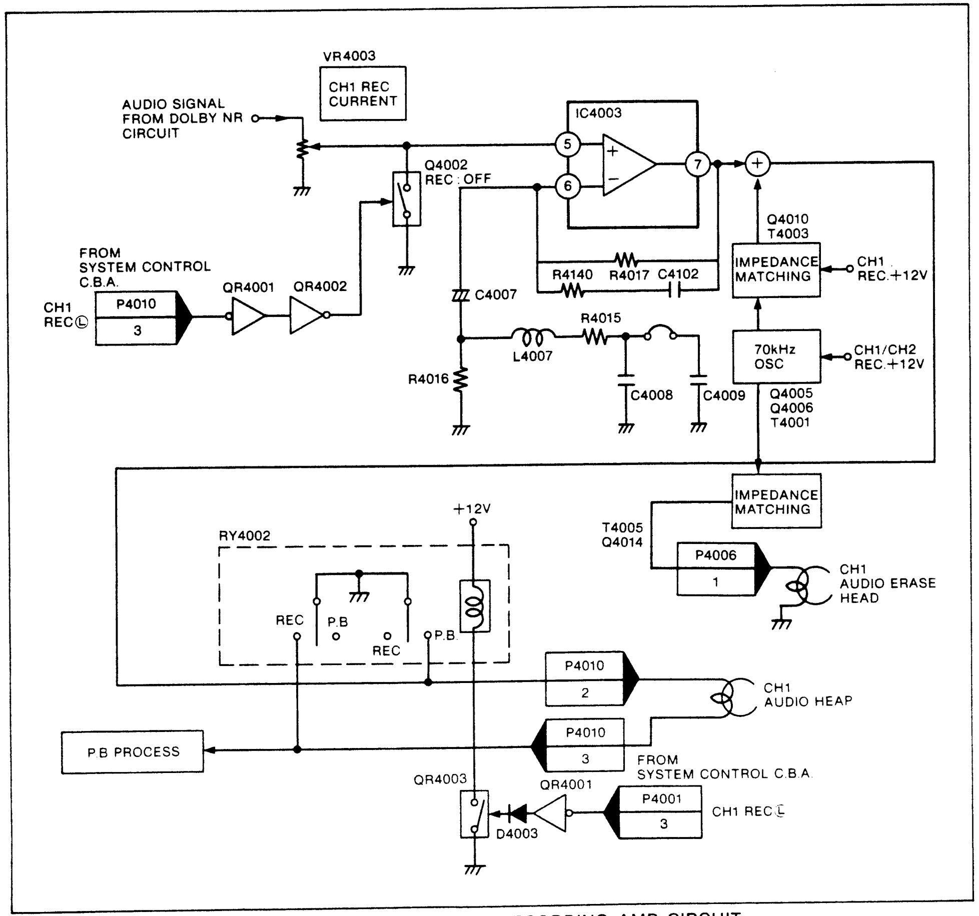

VR4003
CH1 REC CURRENT
AUDIO SIGNAL FROM DOLBY NR CIRCUIT
IC4003
5
6
7
Q4002
REC : OFF
Q4010
T4003
IMPEDANCE MATCHING
CH1 REC.+12V
FROM SYSTEM CONTROL C.B.A.
CH1 REC Ⓛ
P4010
3
QR4001
QR4002
R4140
R4017
C4102
C4007
R4015
L4007
R4016
C4008
C4009
70kHz OSC
CH1/CH2 REC.+12V
Q4005
Q4006
T4001
IMPEDANCE MATCHING
T4005
Q4014
P4006
1
CH1 AUDIO ERASE HEAD
+12V
RY4002
REC
P.B
REC
P.B
P4010
2
CH1 AUDIO HEAP
P.B PROCESS
P4010
3
FROM SYSTEM CONTROL C.B.A.
QR4003
QR4001
P4001
3
CH1 REC Ⓛ
D4003

Figure 6—12 NORMAL AUDIO RECORDING AMP CIRCUIT

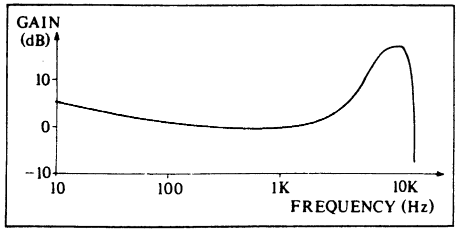


Figure 6-13 Peaking Characteristics

7) Switching Circuit

The audio section contains many switching circuits which consist of transistors or transistors and diodes. The switching circuits are controlled by digital signals from the System Control section to operate the various playback and Record mode switches.
In the Recording mode, the CH1 P.B low signal from the System Control C.B.A. is sent to transistor QR4003 through transistor QR4001 and D4003. Then a relay RY4002 is changed to the REC position and the modulated audio signal is applied to the CH1 audio head (refer to Figure 6-12).

6-3. Normal Audio Playback Process

1) PB Amp & EQ

The playback signal from the head is fed to Pin 2 of IC402 and applied to the next amplifier inside of IC402. The output signal is also fed back to the inverted input of the amplifier through the CR network and the playback equalizer (Figure 6-15). The playback equalizer characteristics are shown in Figure 6-14.

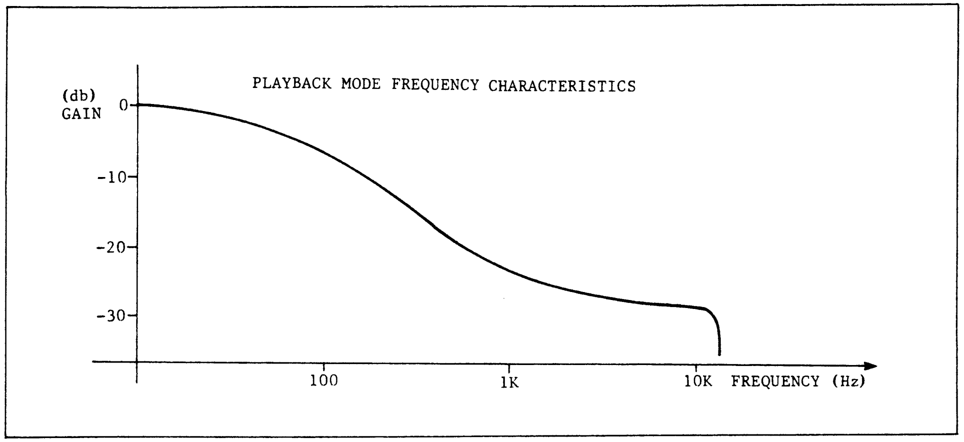


Figure 6—14 Playback Frequency Characteristic

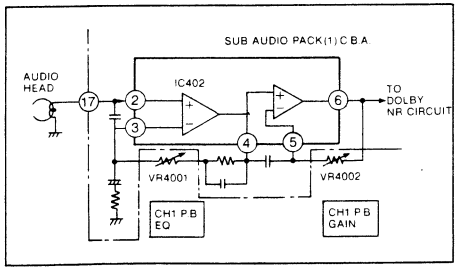

SUB AUDIO PACK(1) C.B.A.
AUDIO HEAD
17
2
3
IC402
4
5
6
TO DOLBY NR CIRCUIT
VR4001
VR4002
CH1 P.B EQ
CH1 P.B GAIN

Figure 6—15 PB Amp & EQ

2) Dolby NR Circuit (decoder)

IC401 is also used for Dolby NR decoding (Playback). As can be seen in Figure 6-16, the decoding signal flow shows little difference from the encoding (recording) flow.
The signal amplified by IC402 is fed to the amplifier (A) between pin 5 and pin 6 of IC401. The amplified signal returns IC401 through pin 2 after being filtered. The signal amplified by amplifier (B) is fed to the adder (E), but this time, the signal is not split or fed to the amplifier inside IC402. The Dolby NR decoded signal comes from pin 7 of IC401, and fed to IC402 through pin 8, where it is amplified, and exits from pin 9. The signal is then fed to the high pass filter and supplied to IC401 through pin 1. the signal is processed in the same way as in the encode mode, then fed to the other input of the adder (E). The Dolby NR decoded output from pin 9 of IC402 is aslo used for the recorder LINE OUT signal which is output from pin 9 of IC402. (after processing by HD/NORMAL SELECT Circuit).
The Frequency Response and Signal Function of DOLBY Decoder as sown in Figure 6-17, 6-18.

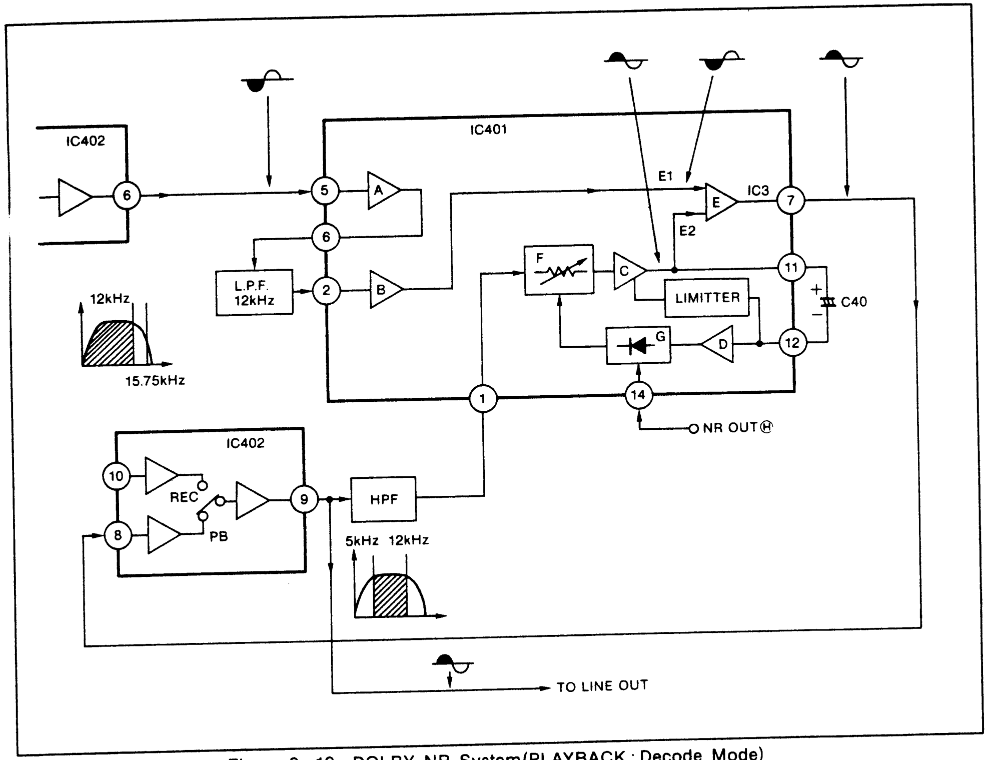

IC402
6
IC401
5
6
2
A
B
L.P.F. 12kHz
12kHz
15.75kHz
E1
E2
E
IC3
7
F
C
LIMITTER
11
12
C40
D
G
1
14
NR OUT Ⓗ
IC402
10
8
REC
PB
9
HPF
5kHz 12kHz
TO LINE OUT

Figure 6—16 DOLBY NR System(PLAYBACK : Decode Mode)

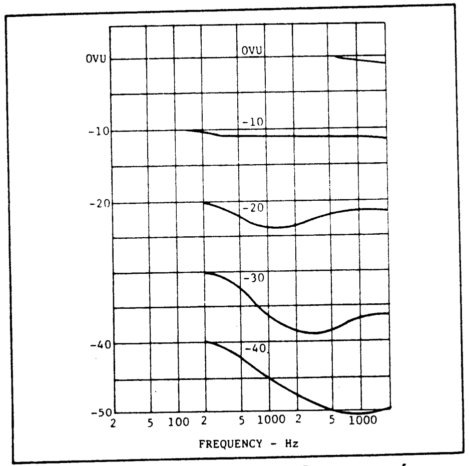


Figure 6—17 Frequency Response of DOLBY Decoder

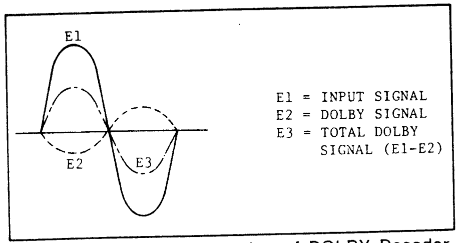

E1
E2
E3
E1 = INPUT SIGNAL
E2 = DOLBY SIGNAL
E3 = TOTAL DOLBY SIGNAL (E1-E2)

Figure 6—18 Signal Function of DOLBY Decoder

3) Mute and POP Noise Elimination

The circuit which eliminates pop noise is shown in Figure 6—19.
The audio circuit can eliminate the pop noise whenever the unit switches from E—E to V—V or V—V to E—E.
In V—V to E—E mode, the CH1 E—E low signal from pin 1 of P4001 is fed to QR405 through D409. Then inverted low to high signal is fed to the differential circuit witch consists C429, D411 and other parts. The positive pulse signal is produced at differential circuit.
In the E—E to V—V mode, the CH1 E—E low signal is fed to QR406 and QR407 through D410. Then the low to high signal is fed to the differential circuit witch consists C430, D412 and other parts. The positive pulse signal is produced at differential circuit. And the positive pulse signal in the V—V to E—E and E—E to V—V mode is sent to base of muting transistor Q405 is turnd on. Then the audio signal is connected to ground.
The muting transistor Q405 is also functioned whenever the unit switches from TC (Time Code) off to on.
The TC off to on, the similar muting circuit is realized by Q4024, C4004, D403.

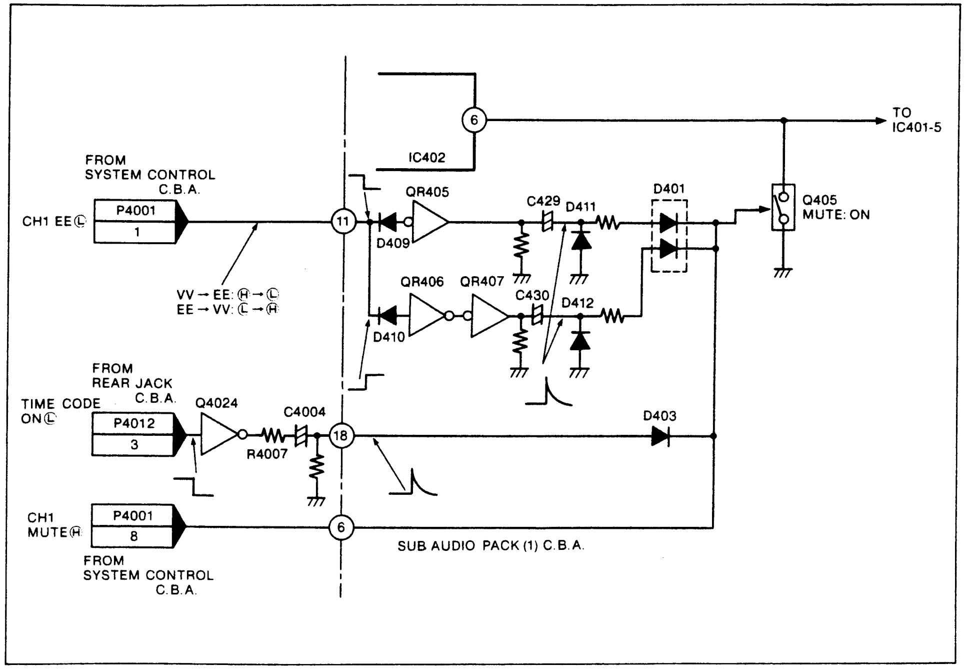

6
TO IC401-5
IC402
FROM SYSTEM CONTROL C.B.A.
CH1 EE Ⓛ
P4001
1
11
QR405
D409
C429
D411
D401
Q405 MUTE: ON
QR406
QR407
C430
D412
D410
VV → EE: Ⓗ → Ⓛ
EE → VV: Ⓛ → Ⓗ
FROM REAR JACK C.B.A.
TIME CODE ON Ⓛ
P4012
3
Q4024
C4004
R4007
18
D403
CH1 MUTE Ⓗ
P4001
8
6
FROM SYSTEM CONTROL C.B.A.
SUB AUDIO PACK (1) C.B.A.

Figure 6—19 Mute and POP Noise Elimination

4) Switchable Low Pass Filter

In the Audio Dub mode of operation, a crosstalk problem can be occur because the CH1 and CH2 audio heads are close to each other. Magnetic coupling between the coils can cause high frequencies which are being recorded in CH2 to be present in the playback of CH2. To prevent this annoying sound, a Switchable Low Pass Filter is used in the CH1 playback path. The CH1 filter consists of C422 and R414. Refer to Figure 6—20.
This filter will route to ground all frequencies above 5kHz when the filter itself is grounded through QR401.
In the Search mode QR401 is turned on by the SEARCH low signal from the Servo C.B.A.

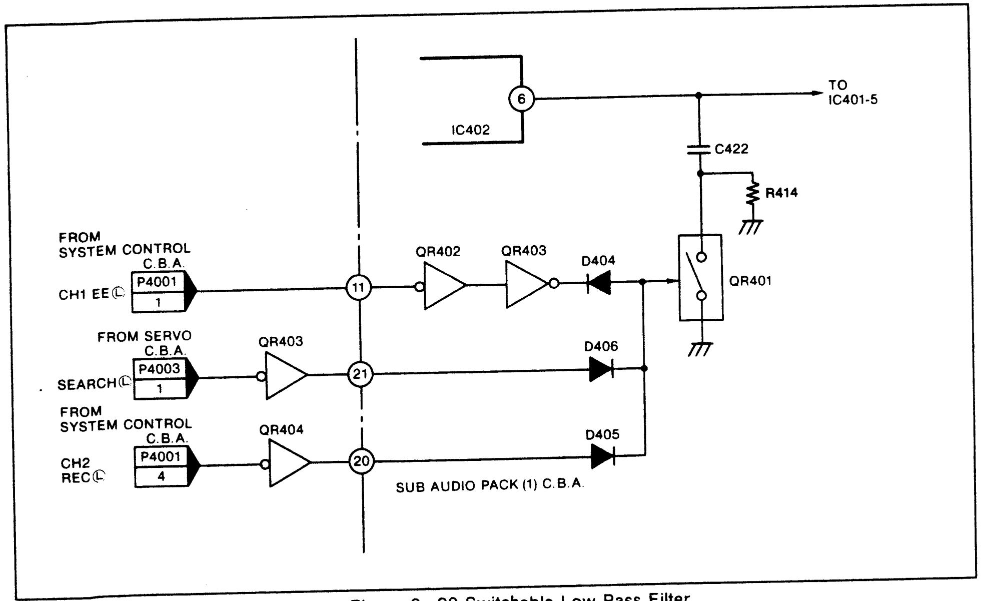

TO
IC401-5
6
IC402
C422
R414
FROM
SYSTEM CONTROL
C.B.A.
CH1 EE
P4001
1
11
QR402
QR403
D404
QR401
FROM SERVO
C.B.A.
SEARCH
P4003
1
QR403
21
D406
FROM
SYSTEM CONTROL
C.B.A.
CH2
REC
P4001
4
QR404
20
D405
SUB AUDIO PACK (1) C.B.A.

Figure 6—20 Switchable Low Pass Filter

6–4. Time Code Circuit

The AG–6500 can record and playback a digital time code signal in the space usually occupied by Audio Channel 2. The CH2 audio head is utilized for this process.

The Time code signal is an 80 bit per frame bi-phase signal in which only the relative pulse width is important, not the pulse polarity.

It is recorded as a saturated magnetic transition without bias.

A simplified block diagram is shown in Figure 6–21.

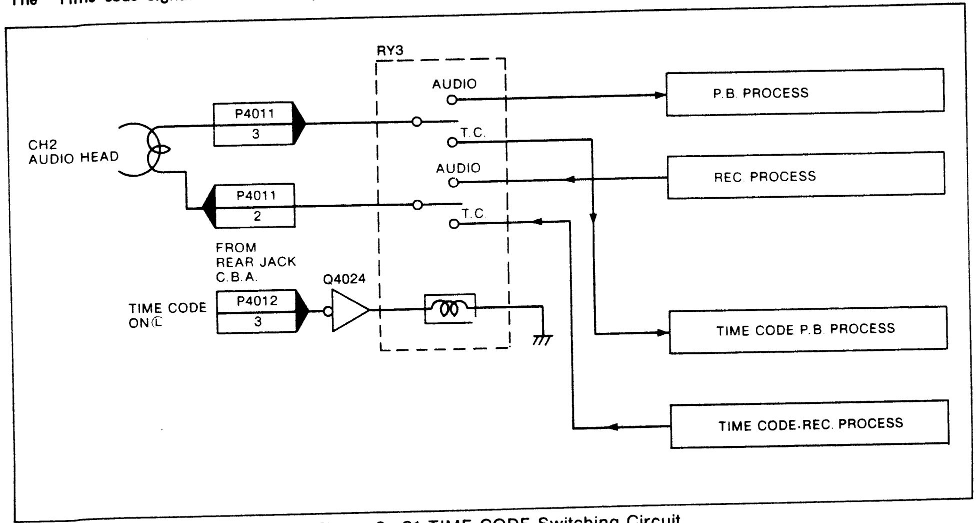

RY3
AUDIO
T.C.
AUDIO
T.C.
P4011
3
P4011
2
CH2
AUDIO HEAD
P.B. PROCESS
REC PROCESS
FROM
REAR JACK
C.B.A.
Q4024
TIME CODE
ON
P4012
3
TIME CODE P.B PROCESS
TIME CODE.REC. PROCESS

Figure 6—21 TIME CODE Switching Circuit

1) REC Amp

The bias difference at the inputs (pins 6, 7) of REC AMP in the TIME CODE PACK (Figure 6–22) is set at 66mV by R25, R26. The incoming T.C. signal is applied to pin 7. The transistor switch (Q4025) ground the non-inverted input of the amplifier to mute the incoming T.C. signal during playback.

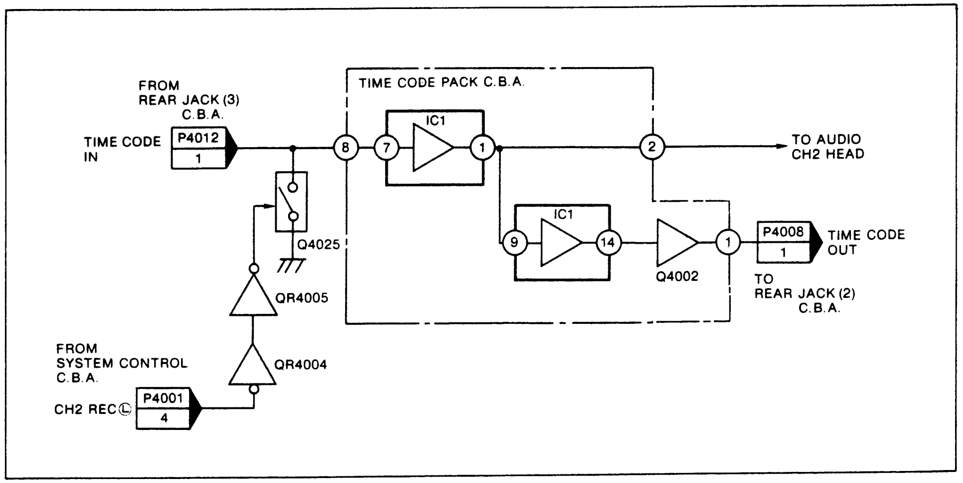

FROM
REAR JACK (3)
C.B.A.
TIME CODE
IN
P4012
1
TIME CODE PACK C.B.A.
8
7
IC1
1
2
TO AUDIO
CH2 HEAD
Q4025
IC1
9
14
Q4002
1
P4008
1
TIME CODE
OUT
TO
REAR JACK (2)
C.B.A.
QR4005
QR4004
FROM
SYSTEM CONTROL
C.B.A.
CH2 REC
P4001
4

Figure 6—22 TIME CODE Recording Amp

2) Playback Amp

Incoming time code signal from the audio CH2 head is amplified by IC4004 and in the TIME CODE PACK.

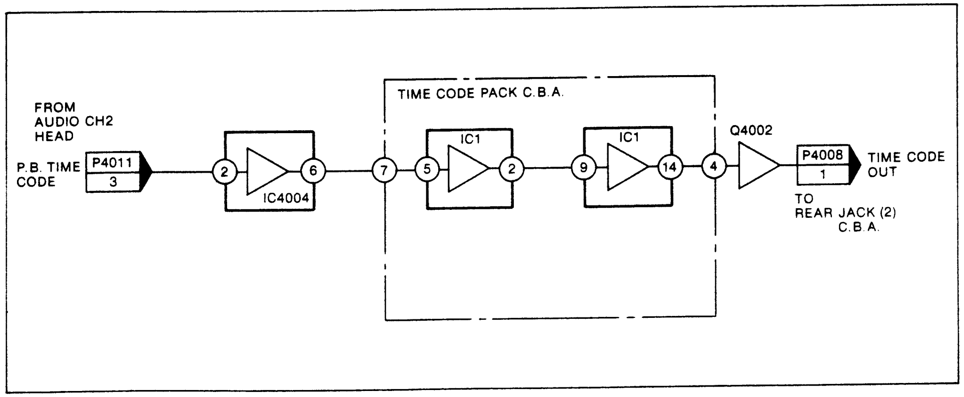

FROM
AUDIO CH2
HEAD
P.B. TIME
CODE
P4011
3
2
6
IC4004
TIME CODE PACK C.B.A.
7
5
IC1
2
9
IC1
14
4
Q4002
P4008
1
TIME CODE
OUT
TO
REAR JACK (2)
C.B.A.

Figure 6—23 TIME CODE Playback Amp

3) PB Wave Shaper and Output Wave Shaper

The PB wave shaper is inside of the TIME CODE PACK. The input is not biased in order to cut the signal at center. The output is sent down the same path used by the E–E signal and fed to the Output wave shaper. The input of this Output wave shaper is biased at 1V.
The output is then amplified by the output amp, Q2 (Figure 6–24), and sent to connector P4008 Pin 1 for use by an external T.C. reader device. The output level of the time code is set at 2.4Vp–p.

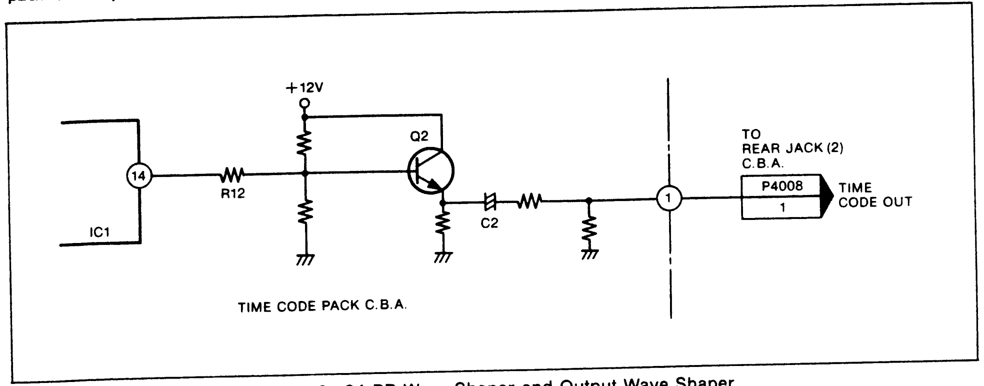

+12V
Q2
14
IC1
R12
C2
1
TO
REAR JACK (2)
C.B.A.
P4008
1
TIME
CODE OUT
TIME CODE PACK C.B.A.

Figure 6—24 PB Wave Shaper and Output Wave Shaper

4) Threshold Amp

For playback T.C., a threshold is established. If the T.C. playback level is good, the T.C. signal is allowed to be passed. If the playback T.C. level is below the threshold, the output is blocked to prevent misreading by the time code reader.
R8, 9 set the threshold level at 8mVp–p (Figure 6–25).

When there is no T.C. playback, the threshold amp outputs high from IC1–13, turning on Q1 and muting the T.C. playback. The same is true if the T.C. playback is below the threshold level.
When T.C. playback exceeds the threshold, the signal appears at the output pin 13 of IC1, and the "OFF" portions of the signal keep C1 almost fully discharged by the fast discharge path through R4. For this condition, Q1 stays off, passing the T.C. signal.

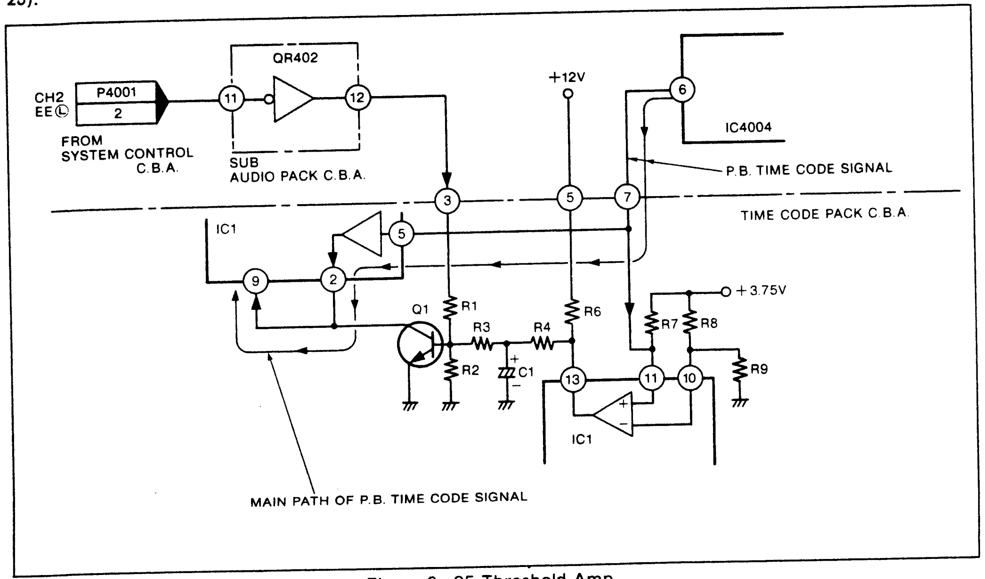

CH2
EE⒧
P4001
2
FROM
SYSTEM CONTROL
C.B.A.
QR402
11
12
SUB
AUDIO PACK C.B.A.
+12V
6
IC4004
P.B. TIME CODE SIGNAL
3
5
7
TIME CODE PACK C.B.A.
IC1
5
9
2
Q1
R1
R3
R4
R6
R7
R8
+3.75V
R2
C1
13
11
10
R9
IC1
MAIN PATH OF P.B. TIME CODE SIGNAL

Figure 6—25 Threshold Amp

6–5. HD AUDIO CIRCUIT

Introduction

Rotary Audio Heads and the Depth Multiplex Recording System

The Audio Heads, AL and AR, are installed on the upper cylinder as shown in Figure 2–16. The rotary heads result in a sharply increased relative tape speed of about 200 times the normal audio recording speed of 23.39mm/sec. with stationary heads.
The Audio Heads AL and AR, are separated by 120degrees from the video heads, and at a height micrometers above the video had height.
Azimuth angles are –30degrees and +30degrees for AL and AR respectively. In addition, the Audio Head gaps are about 3 times as wide as the Video Heads gaps.
Using these heads, audio signals can be recorded by AL head (–30degrees) on the deep layer of the magnetic substance of the tape first, followed by video signals that are recorded by R head (+6degrees) on the surface of the magnetic substance of the tape, as shown in Figure 6–30.
This system, that records both the audio and video signals on the tape in double layers, is called a "Depth Multiplex" system as shown in Figure 6–31.

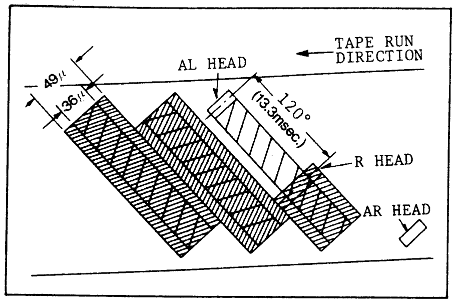

49µ
36µ
AL HEAD
TAPE RUN
DIRECTION
120°
(13.3msec.)
R HEAD
AR HEAD

Figure 6—30 Rotary Audio Head

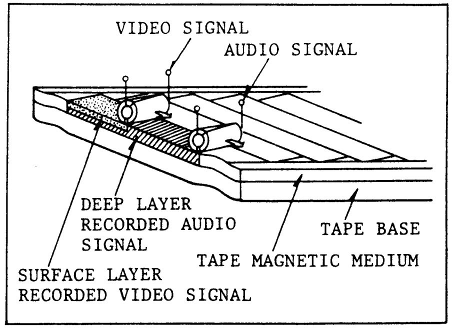

VIDEO SIGNAL
AUDIO SIGNAL
DEEP LAYER
RECORDED AUDIO
SIGNAL
TAPE BASE
TAPE MAGNETIC MEDIUM
SURFACE LAYER
RECORDED VIDEO SIGNAL

Figure 6—31 Depth Multiplex Recording

The HD Audio block diagram is shown on page 3–27 of the AG–6500 Service Manual.

FM Modulation Audio Recording System

The audio signal for the left channel will be FM modulated onto a 1.4MHz carrier, while the right channel will be FM modulated a 1.8MHz carrier.
Each channel uses a frequency deviation of +–150kHz.
(Figure 6–33 shows the position of the HD audio signal on the total signal spectrum.)
This results in a significantly improved S/N ratio and effectively prevents possible interference from the video signals.

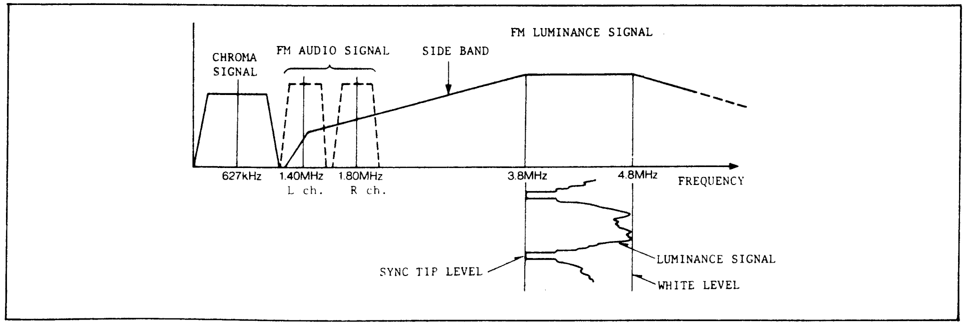


Figure 6—33 HD(Hi-Fi) VHS Signal Spectrum

Noise Reduction system

Noise reduction in the AG-6500 is achieved by a New Noise Reduction System.
This system differs from the more widely known Dolby System, and operates as follows:
The dynamic range of the input signal is compressed to 1/2 its original level and then recorded. The recorded signal is then expanded prior to playback in order to restor it to the original level.
Figure 6-32 shows how this process effectively results in a 90dB.
Dynamic range, and places the tape saturation and tape hiss noise regions outside of the playback audio range.

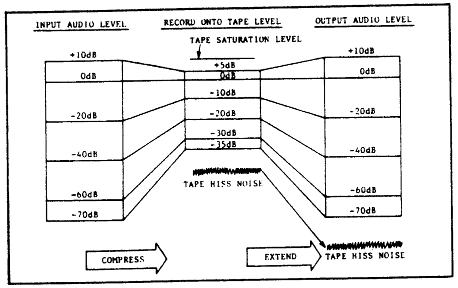

INPUT AUDIO LEVEL
RECORD ONTO TAPE LEVEL
OUTPUT AUDIO LEVEL
TAPE SATURATION LEVEL
+10dB
0dB
-20dB
-40dB
-60dB
-70dB
+5dB
0dB
-10dB
-20dB
-30dB
-35dB
TAPE HISS NOISE
+10dB
0dB
-20dB
-40dB
-60dB
-70dB
COMPRESS
EXTEND
TAPE HISS NOISE

Figure 6—32 Noise Reduction System

Detailed Description

Since similar circuits are used in each channel, the following description will apply to either channel but only diagrams for channel 1 components will be shown.

1) Recording Process

A. L.P.F. (20KHz)

The selected audio signal to the HD audio C.B.A. is sent to amplifier inside IC4304 and then sent to L.P.F. consisted of C4331, C4332, C4333 and C4334, it must be stripped of its more than 20kHz portion in order to prvide an audio only signal for FM modulation.
(See Figure 6-34).

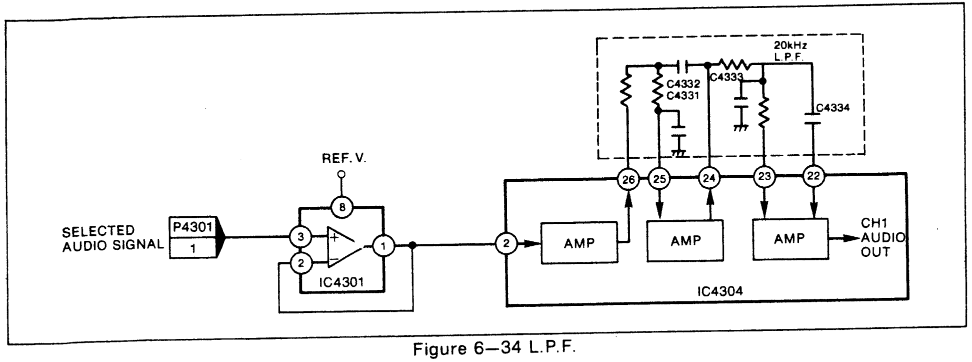

20kHz
L.P.F.
C4332
C4331
C4333
C4334
REF. V.
8
SELECTED
AUDIO SIGNAL
P4301
1
3
2
1
IC4301
2
26
25
24
23
22
AMP
AMP
AMP
CH1
AUDIO
OUT
IC4304

Figure 6—34 L.P.F.

B. Pre-emphasis (1)

The pre-emphasis (1) circuit emphasizes the high frequencies according to the characteristic of Figure 6-35 and then sends the emphasized signal to the VCA circuit. This circuit is used to provide the Hi-Fi extended frequency range of 20Hz to 20kHz as shown in Figure 6-35.
Referring to the circuit diagram (Figure 6-36).

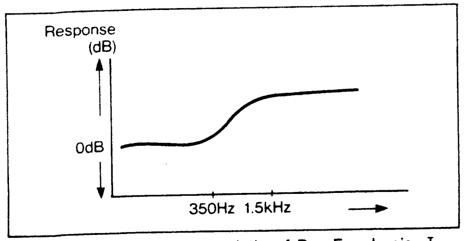


Figure 6—35 Characteristic of Pre-Emphasis - I

The output of filter and amp passes through the pre-emphasis circuit composed of OP amp inside IC4303, R4358, R4359 and C4335.

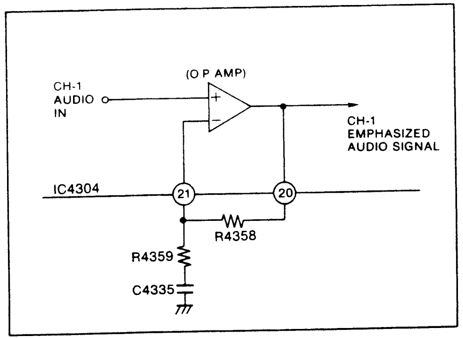

(O P AMP)
CH-1
AUDIO
IN
+
−
CH-1
EMPHASIZED
AUDIO SIGNAL
IC4304
21
20
R4358
R4359
C4335

Figure 6—36 Pre-Emphasis I Circuit

C. CCA (Current Controlled Amplifier / Attenuator)

The CCA circuit performs logarithmic compression low distortion over a wide range of input signal levels.
This circuit is an amplifier whose gain changes logarithmically in accordance with the DC control voltage from the RMS detector. (See Figure 6-39).

In the recording mode the CCA circuit serves as an attenuator when the input level is higher than the CCA input standard level (0 dB), and as an amplifier when the input level is lower than the CCA input standard level.
This action of the CCA is illustrated for three input levels in Figure 6-37, and shows how the output signal level range is compressed.
The characteristic of CCA is shown in Figure 6-38.

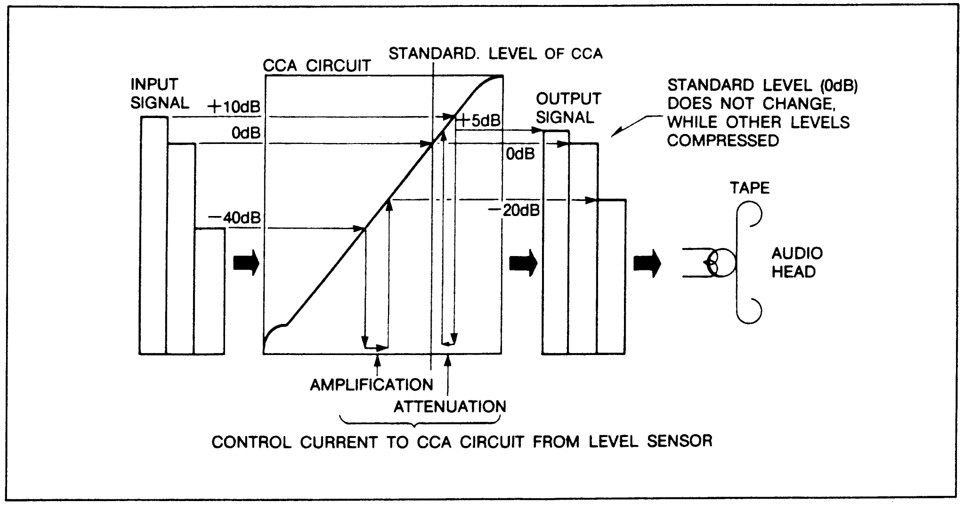

STANDARD. LEVEL OF CCA
CCA CIRCUIT
INPUT
SIGNAL
+10dB
0dB
−40dB
+5dB
0dB
−20dB
OUTPUT
SIGNAL
STANDARD LEVEL (0dB)
DOES NOT CHANGE,
WHILE OTHER LEVELS
COMPRESSED
TAPE
AUDIO
HEAD
AMPLIFICATION
ATTENUATION
CONTROL CURRENT TO CCA CIRCUIT FROM LEVEL SENSOR

Figure 6—37 Record Input Output Characteristic of CCA Circuit

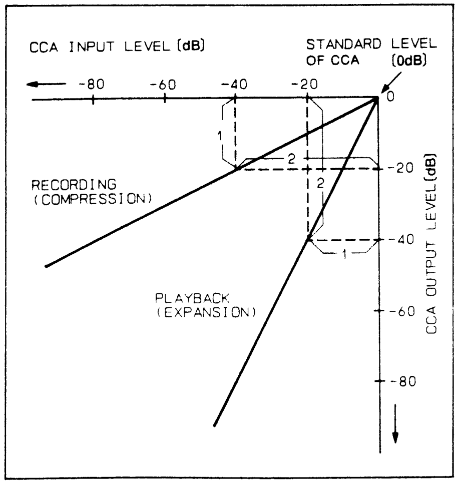


Figure 6—38 Characteristic of CCA

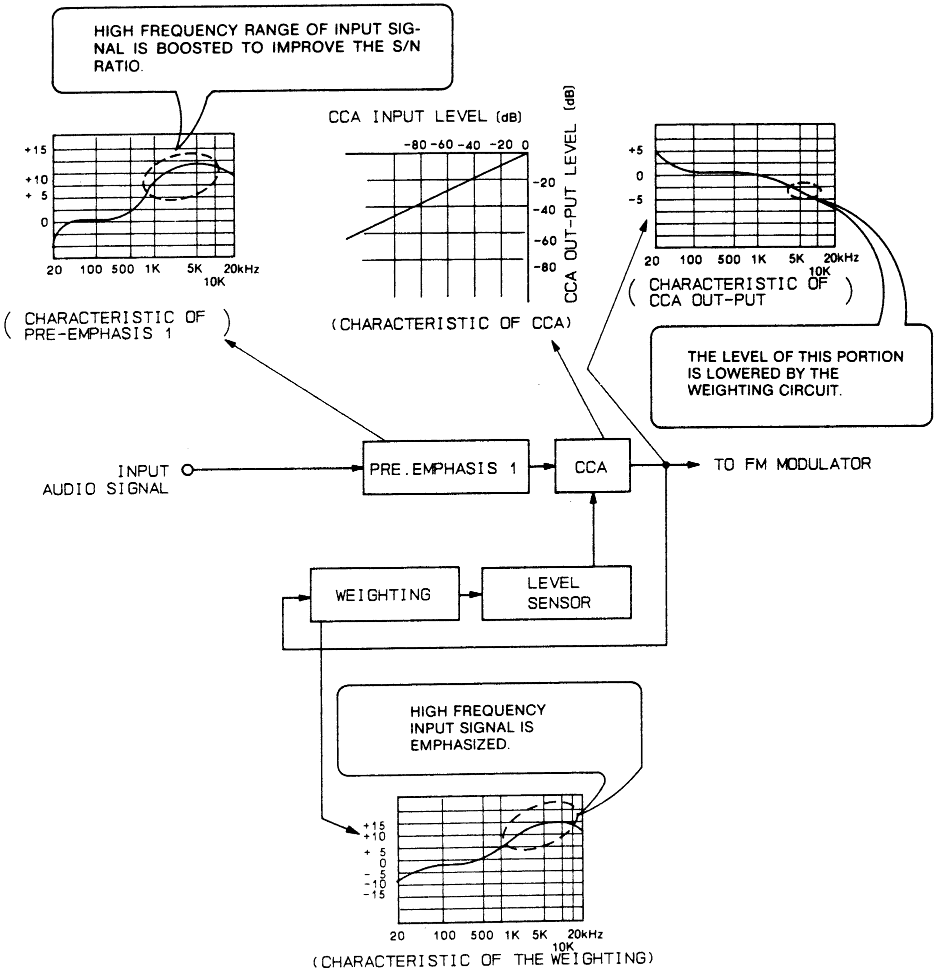
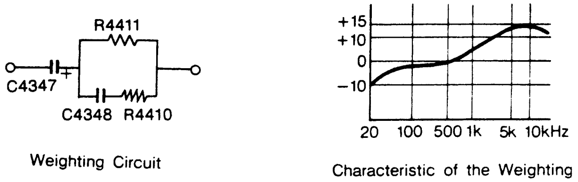

HIGH FREQUENCY RANGE OF INPUT SIGNAL IS BOOSTED TO IMPROVE THE S/N RATIO.
+15
+10
+ 5
0
20 100 500 1K 5K 20kHz 10K
(CHARACTERISTIC OF PRE-EMPHASIS 1)
CCA INPUT LEVEL (dB)
-80 -60 -40 -20 0
-20
-40
-60
-80
CCA OUT-PUT LEVEL (dB)
(CHARACTERISTIC OF CCA)
+5
0
-5
20 100 500 1K 5K 20kHz 10K
(CHARACTERISTIC OF CCA OUT-PUT)
THE LEVEL OF THIS PORTION IS LOWERED BY THE WEIGHTING CIRCUIT.
INPUT AUDIO SIGNAL
PRE.EMPHASIS 1
CCA
TO FM MODULATOR
WEIGHTING
LEVEL SENSOR
HIGH FREQUENCY INPUT SIGNAL IS EMPHASIZED.
+15
+10
+ 5
0
- 5
-10
-15
20 100 500 1K 5K 20kHz 10K
(CHARACTERISTIC OF THE WEIGHTING)

Figure 6-39 Noise Reduction Simplifed Block Diagram

D. Weghting Circuit

The weighting circuit and characteristic are shown in Figure 6—40.
To prevent saturation levels at the pre—emphasized high frequency, a weighting circuit is used ahead of the level sensor. The weighting circuit increases the level of the high frequency in the input signal and to the level sensor.
The next effect is an increase in detection voltage and feed to the CCA.
The CCA is a decrease the gain at these frequency.
As a result, linearity is enhanced in the high frequency range.


R4411
C4347
C4348 R4410
+15
+10
0
−10
20 100 500 1k 5k 10kHz

Weighting Circuit

Characteristic of the Weighting

Figure 6—40 Weighting

E. Level Sensor

The level sensor circuit consists of the weighting circuit and the level sensor, which produces CCA (Current Control Amplifier) control current that controls the CCA according to the level sensor input signal. To begin with, the peak value of the level sensor input signal is detected by the level sensor that produces the CCA control current in proportion to the logarithum of the detecting level.
The peak detection chart is shown in Figure 6—41.

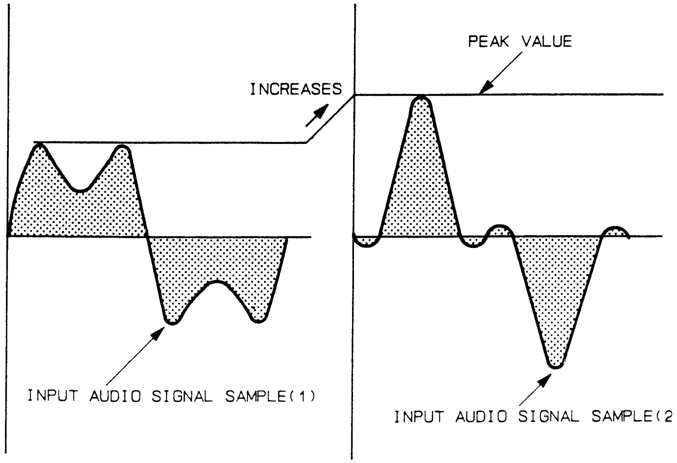


Figure 6-41 Level Sensor

F. Pre-emphasis (2) (for Noise Reduction)

The VCA output is then further processed to a second pre-emphasis circuit to improve the signal-to-noise ratio of high frequency during playback. Figure 6-42 shows the pre-emphasis (2) circuit which is an active RC filter using an operational amplifier inside of IC4502 and the external components R4365, C4345, and ,R4364.
This pre-emphasis characteristics is shown in Figure 6-43.

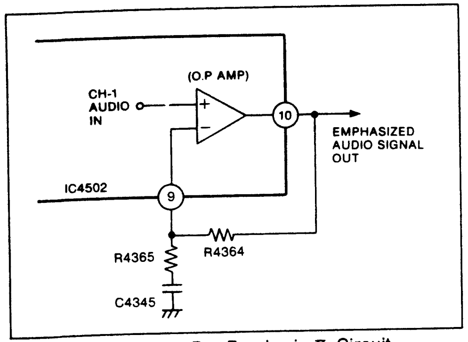

(O.P AMP)
CH-1
AUDIO
IN
+
−
10
EMPHASIZED
AUDIO SIGNAL
OUT
IC4502
9
R4364
R4365
C4345

Figure 6-42 Pre-Emphasis II Circuit

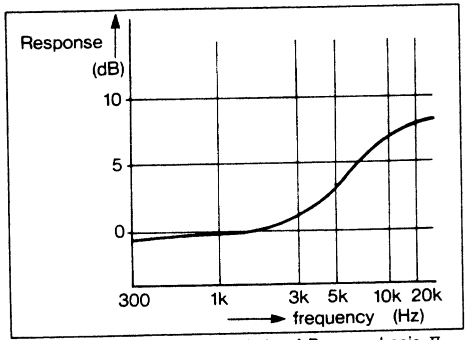


Figure 6-43 Characteristic of Pre-emphasis-II

G. FM Modulator

The audio signal is FM modulated by the VCO (Voltage Controlled Oscillator) inside of IC4306.
The recording level (Deviation) is controled by R4302 and the 1.4MHz (See Figure 6-44) carrier FM signal of channel 1 is determined by R4303.

H. L.P.F (Low Pass Filter)

The modulated FM signal from IC4306 pin 16 is applied to the low pass filter C4376 C4378 and L4305 which removes the second, third, and higher harmonics of the modulation process.
(See Figure 6-44).

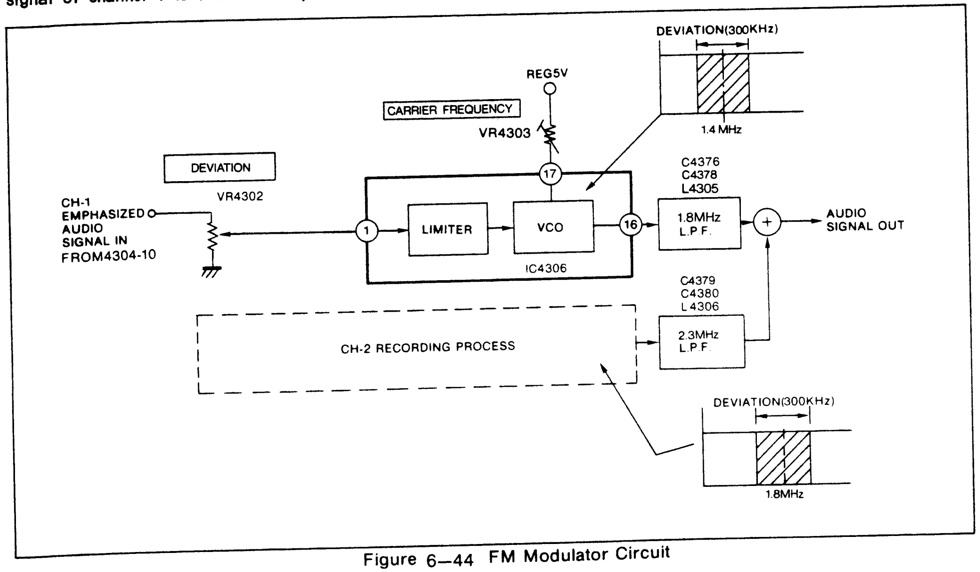

DEVIATION(300KHz)
1.4 MHz
REG5V
CARRIER FREQUENCY
VR4303
DEVIATION
VR4302
CH-1
EMPHASIZED
AUDIO
SIGNAL IN
FROM4304-10
1
LIMITER
VCO
17
16
IC4306
C4376
C4378
L4305
1.8MHz
L.P.F.
+
AUDIO
SIGNAL OUT
C4379
C4380
L 4306
2.3MHz
L.P.F.
CH-2 RECORDING PROCESS
DEVIATION(300KHz)
1.8MHz

Figure 6-44 FM Modulator Circuit

I. Recording Amplifier

After the low pass filter, two FM audio signals are mixed, and applied to the REC CURRENT volume that decides the recording current by VR4304. These mixed signal is applied to the buffer and the recording amplifier that consists of transistors Q4801-Q4805. And this signal is amplified to a proper recording level for two audio heads and are sent to two audio rotary heads. (See Figure 6-45).

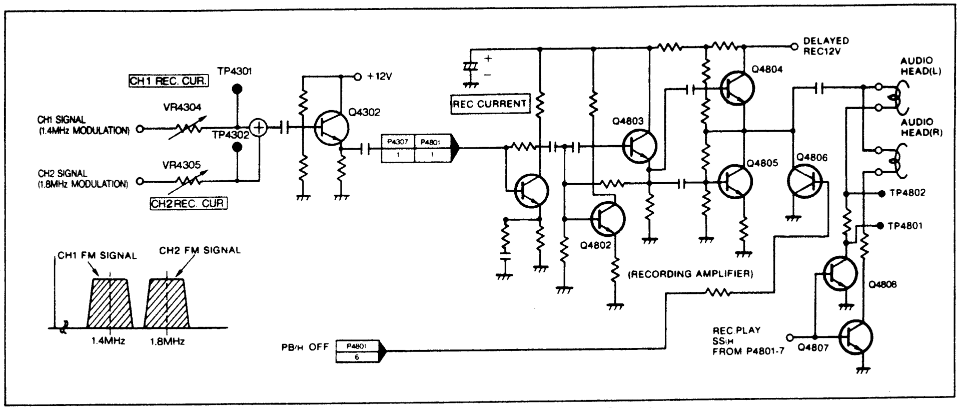

CH1 REC. CUR.
TP4301
+12V
CH1 SIGNAL
(1.4MHz MODULATION)
VR4304
TP4302
Q4302
CH2 SIGNAL
(1.8MHz MODULATION)
VR4305
CH2 REC. CUR
P4307
1
P4801
1
REC CURRENT
DELAYED
REC12V
Q4804
AUDIO
HEAD(L)
AUDIO
HEAD(R)
Q4803
Q4805
Q4806
TP4802
TP4801
Q4802
(RECORDING AMPLIFIER)
Q4808
CH1 FM SIGNAL
CH2 FM SIGNAL
1.4MHz
1.8MHz
PB/H OFF
P4801
6
REC PLAY
SS/H
FROM P4801-7
Q4807

Figure 6-45 Recording Amplitier Circuit

2) Playback Process

A. Pre-head Amplifier Circuit

The Pre-head amplifier circuit is necessary to reduce the audio switching noise. The playback audio signal level is small and is switched by switching pulse, when the audio signal is played back, discontinuous phase is occuned, so switching noise is contained like spike after FM demodulation. This switching noise comparison chart is shown in Figure 6-46 and the pre-head amplifier is shown in Figure 6-47.

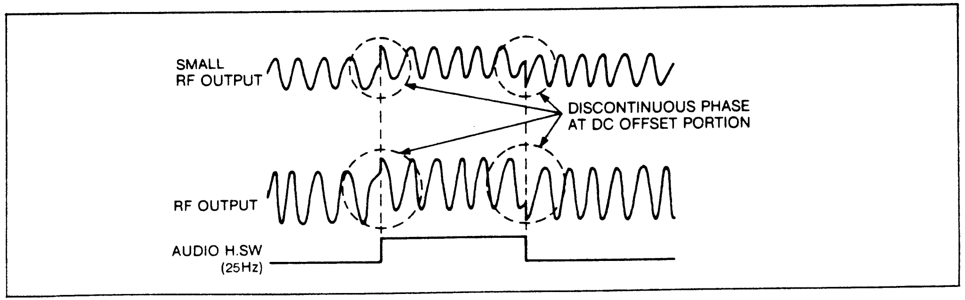

SMALL
RF OUTPUT
DISCONTINUOUS PHASE
AT DC OFFSET PORTION
RF OUTPUT
AUDIO H.SW
(25Hz)

Figure 6-46 Switching Noise Comparsion Chart

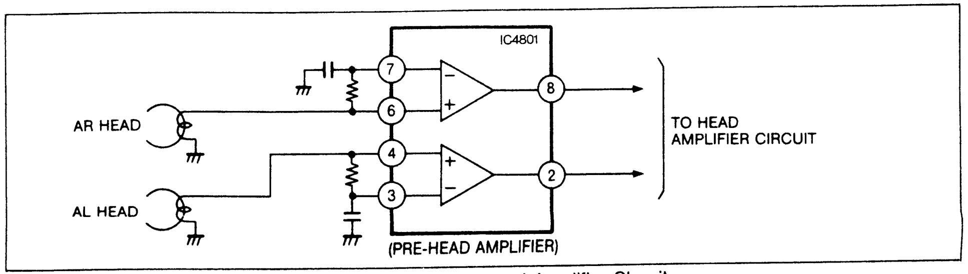

IC4801
7
6
8
AR HEAD
4
3
2
AL HEAD
TO HEAD
AMPLIFIER CIRCUIT
(PRE-HEAD AMPLIFIER)

Figure 6-47 Pre-head Amplifier Circuit

B. Head Amp Circuit

Figure 6–48 shows the head amplifier and switching circuits. FM audio signals from the pre–head amplifiers are sent to IC4802 Pin 2 in CH1 and Pin 20 in CH2 .
The intermittent signals are converted into continuous signals by the 120 degree advanced HD audio head switching signal which is produced by a 60 degree delayed video head switching pulse at pin 18 of IC4802.
The timing chart for the HD audio head switching pulse is shown in Figure 6–49.

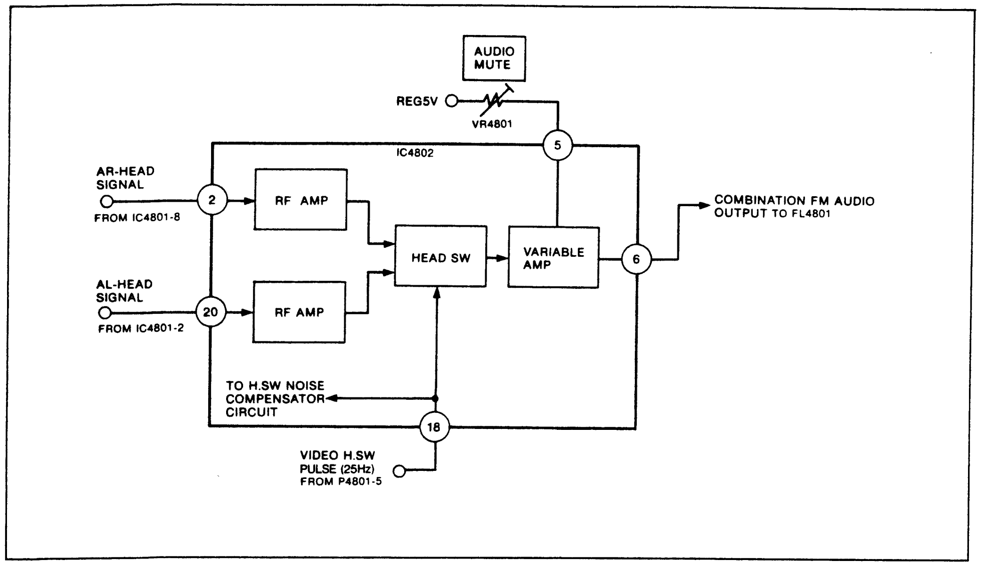

AUDIO MUTE
REG5V
VR4801
5
IC4802
AR-HEAD SIGNAL
2
FROM IC4801-8
RF AMP
HEAD SW
VARIABLE AMP
6
COMBINATION FM AUDIO OUTPUT TO FL4801
AL-HEAD SIGNAL
20
FROM IC4801-2
RF AMP
TO H.SW NOISE COMPENSATOR CIRCUIT
18
VIDEO H.SW PULSE (25Hz) FROM P4801-5

Figure 6–48 Head Amp and Audio H.SW Pulse Generator Circuit

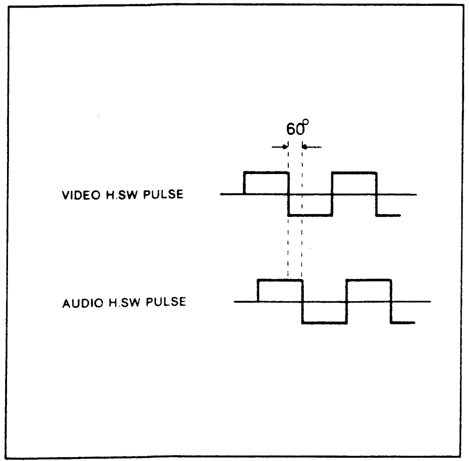

60°
VIDEO H.SW PULSE
AUDIO H.SW PULSE

Figure 6–49 Audio H.SW Pulse Timing Chart

C. Band Pass Filter

The output signal of the head amplifier IC4802 combines the FM audio signals CH1 and CH2 that are separated by the two Band pass filters. To begin with, the CH–1 signal is separated by the 1.4MHz B.P.F FL4801. The CH–2 signal is separated by the 1.8MHz B.P.F FL4801. Then both separated signals are applied to the next playback process circuit. (See Figure 6–50).

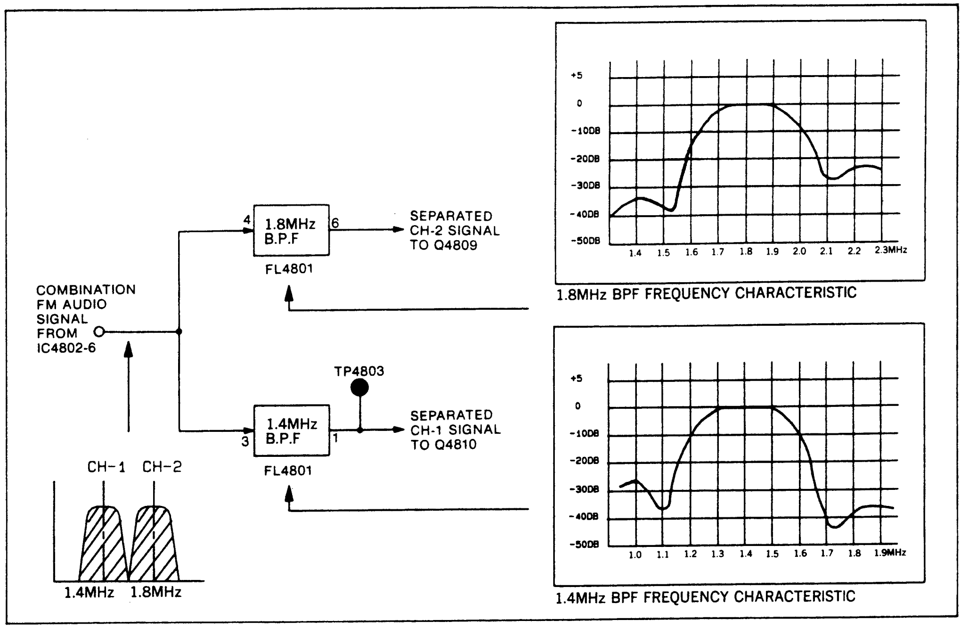


Figure 6–50 Characteristic of B.P.F.

D. FM Demodulator

This is a typical phase locked loop circuit. This phase comparator generates a varying D.C voltage according to the phase difference between the FM input and the VCO. This DC voltage is fed back to the VCO that is to trace the frequency variations of the input.
In this way, the FM signal is converted into an audio signal at the phase comparator output.
This demodulator circuit is shown in Figure 6–51.

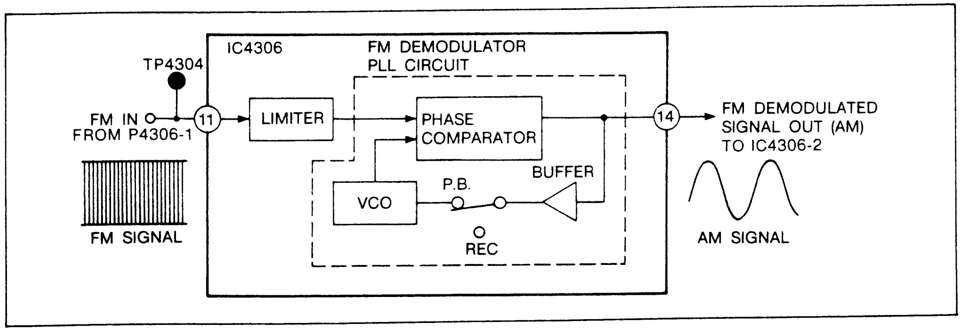

IC4306
FM DEMODULATOR PLL CIRCUIT
TP4304
FM IN
FROM P4306-1
11
LIMITER
PHASE COMPARATOR
14
FM DEMODULATED SIGNAL OUT (AM) TO IC4306-2
BUFFER
P.B.
VCO
REC
FM SIGNAL
AM SIGNAL

Figure 6–51 FM Demodulator

E. 100kHz LOW Pass Filter

An FM demodulated signal is sent to 100kHz L.P.F. Actually, the FM demodulated signal is noisy because of carrier frequency leaks. This L.P.F is used to prevent carrier leaks and is also used to delay the audio signal.

F. DOC and Head Switching Noise Compensator

Figure shows 6–53 the circuit for the dropout and head switching noise compensation, and Figures 6–54 and 6–55 show the waveforms associated with the referenced points in the circuit.
Two types of compensation are illustrated in Figures 6–53, 6–54 and 6–55.

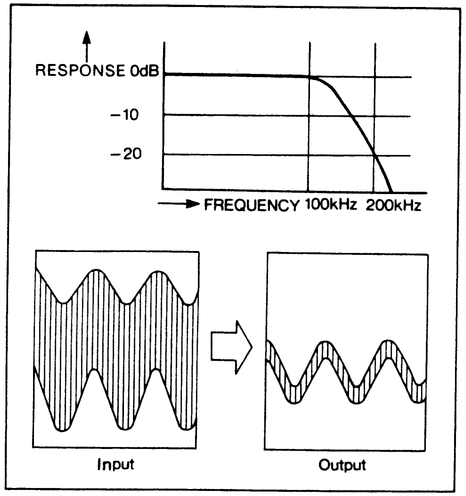


Figure 6—52 Characteristic of 100KHz L.P.F.

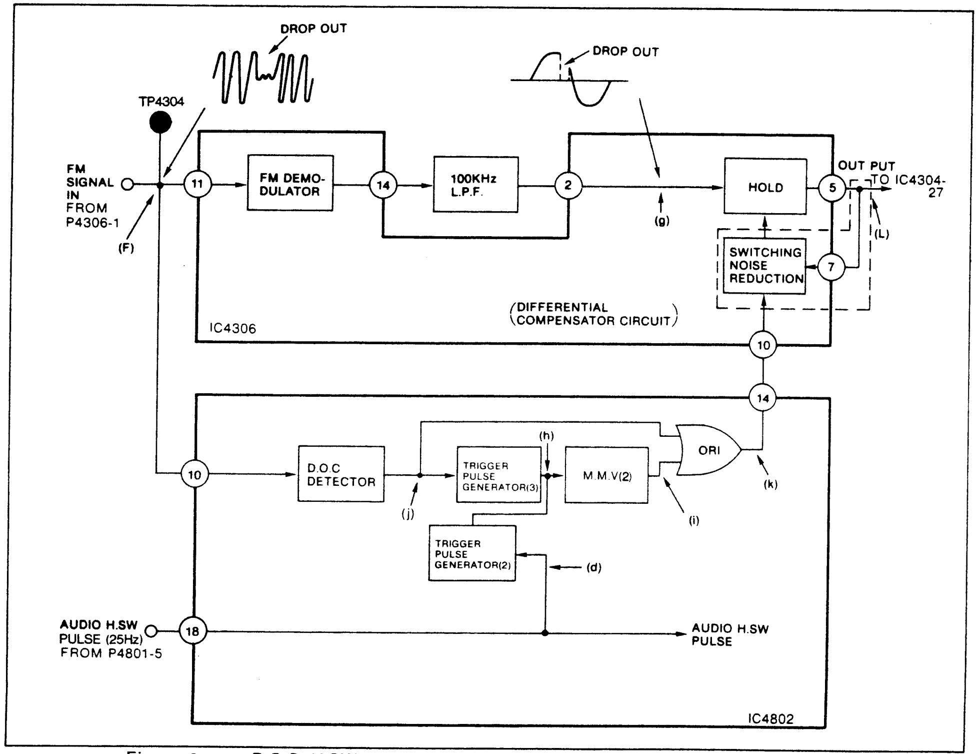

DROP OUT
DROP OUT
TP4304
FM SIGNAL IN FROM P4306-1
(F)
11
FM DEMO-DULATOR
14
100KHz L.P.F.
2
(g)
HOLD
5
OUT PUT TO IC4304-27
(L)
SWITCHING NOISE REDUCTION
7
(DIFFERENTIAL COMPENSATOR CIRCUIT)
IC4306
10
14
10
D.O.C DETECTOR
(j)
(h)
TRIGGER PULSE GENERATOR(3)
M.M.V(2)
(i)
ORI
(k)
TRIGGER PULSE GENERATOR(2)
(d)
AUDIO H.SW PULSE (25Hz) FROM P4801-5
18
AUDIO H.SW PULSE
IC4802

Figure 6—53 D.O.C. H.SW Noise Compensator and Differential Compensator Circuit

If dropout occurs between head switching points as illustrated for the FM signal in Figure 6–54, the following sequence of actions takes place:

a. A positive going pulse (j) appears at the output of the dropout detector, and is produced the positive trigger pulse (h).

b. The positive pulse (h) produces the T1 portion of the HOLD waveform (i) at one input to OR Gate 1.

c. The DOC pulse of waveform (j) at one input to OR Gate 1.

The avove operation enables the HOLD circuit for the duration DOC+T1 and maintains the audio signal interval. (See Figures 6–53 and 6–54).

The compensation at the head switching points is performed as follows:

a. Each edge of the audio head switching signal produces a trigger pulse (h).

b. Waveform (h) triggers the MMV (2) to produce a pulse (i).

The above operation enables the HOLD circuit for the duration T and maintains the audio head switching noise. (See Figures 6–53 and 6–55).

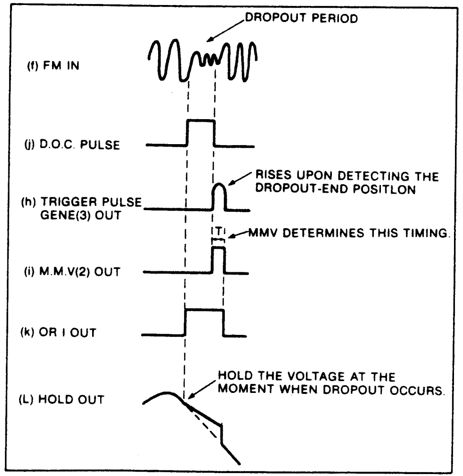

DROPOUT PERIOD
(f) FM IN
(j) D.O.C. PULSE
RISES UPON DETECTING THE DROPOUT-END POSITLON
(h) TRIGGER PULSE GENE(3) OUT
T1
MMV DETERMINES THIS TIMING.
(i) M.M.V(2) OUT
(k) OR I OUT
HOLD THE VOLTAGE AT THE MOMENT WHEN DROPOUT OCCURS.
(L) HOLD OUT

Figure 6—54 D.O.C. Timing Chart

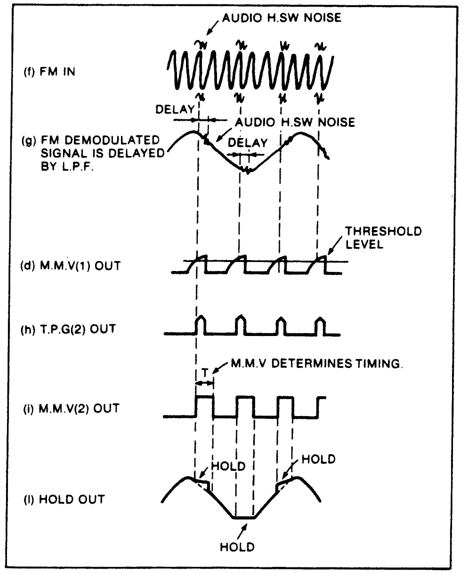

AUDIO H.SW NOISE
(f) FM IN
DELAY
AUDIO H.SW NOISE
DELAY
(g) FM DEMODULATED SIGNAL IS DELAYED BY L.P.F.
THRESHOLD LEVEL
(d) M.M.V(1) OUT
(h) T.P.G(2) OUT
T
M.M.V DETERMINES TIMING.
(i) M.M.V(2) OUT
HOLD
HOLD
(l) HOLD OUT
HOLD

Figure 6—55 H.SW Noise Compensator Timing Chart

G. Differential Compensator Circuit

The differential compensator circuit is used, rather than a HOLD compensator circuit for the following reasons.
In the case of the HOLD compensator circuit, the audio signal is contained in a high frequency component which is called head switching noise at the end edge of holding. But if the Differential compensator circuit is used, the audio signal is differentiated during the Dropout or Audio head switching period. As a result, compared with Hold compensation the noise component contained in the high frequency audio signal is reduced. Therefore, high frequency noise can be improved. This is the difference between HOLD compensation and the Differential compensation, which is shown in Figure 6–56.

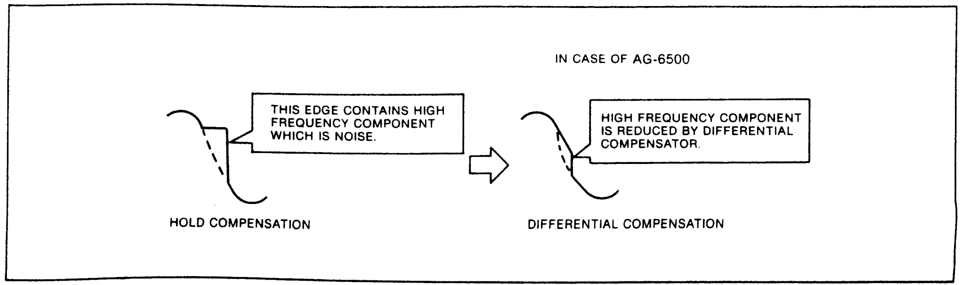

IN CASE OF AG-6500
THIS EDGE CONTAINS HIGH FREQUENCY COMPONENT WHICH IS NOISE.
HIGH FREQUENCY COMPONENT IS REDUCED BY DIFFERENTIAL COMPENSATOR.
HOLD COMPENSATION
DIFFERENTIAL COMPENSATION

Figure 6—56 HOLD and Differential Compensation Characteristic

H. 20KHz LPF

The dropout compensated audio signal is then fed to the 20KHz LPF. This LPF shapes the output of dropout signal as shown in Figure 6–57.

I. De–emphasis (2)

During the recording mode, the audio signal was emphasized by the pre–emphasis (2) circuit. Therefore, in the playback mode, the emphasized audio signal must be de–emphasized by the de–emphasis (2) circuit. This de–emphasis (2) circuit is shown in Figure 6–58.

J. Weighting

The de–emphasized audio signal is then the weighting circuit to restore the original frequency characteristic.
The weighting circuit action in playback restores the original frequency characteristic because the playback weighted output characteristic is reversed by the inverter stage between the Level Sensor. (See Figure 6–60).

K. Level Sensor

To control the CCA circuit, the Level Sensor circuit detects the root mean square value of the audio signal and converts it to a DC voltage as was described in the recording mode. The playback process uses the same type of Level Sensor as was used during the record process. (See Figure 6–60)

L. CCA (Current Controlled Amplifier / Attenuator)

The playback CCA performs logarithmic expansion to restore the original dynamic range of the audio signal.

Expansion is performed by the same type of CCA circuit as was used in the record process to perform compression because of the inverter stage between the Level Sensor and the CCA. Figure 6–59 shows the expansion characteristic of the playback CCA, and should be compared with Figure 6–37 which shows the compression characteristic of the record CCA.
Note that during playback, input levels above –8dB are amplified while levels below –8dB are attenuated (just the reverse of the actions performed by the record CCA.) Refer to Figure 6–59.

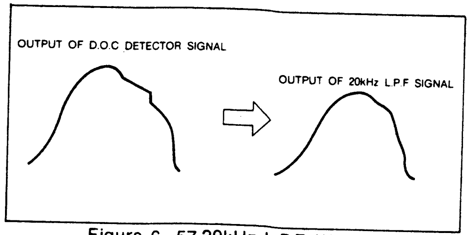

OUTPUT OF D.O.C DETECTOR SIGNAL
OUTPUT OF 20kHz L.P.F SIGNAL

Figure 6–57 20kHz L.P.F. Waveform

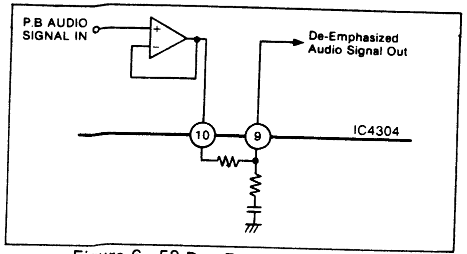

P.B AUDIO SIGNAL IN
De-Emphasized Audio Signal Out
10
9
IC4304

Figure 6–58 De–Emphasis II Circuit

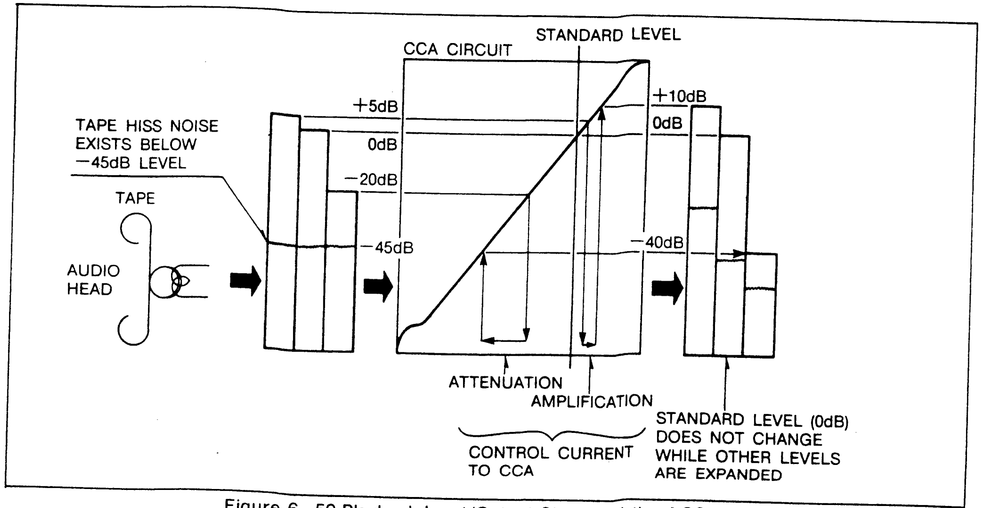

STANDARD LEVEL
CCA CIRCUIT
TAPE HISS NOISE EXISTS BELOW –45dB LEVEL
TAPE
AUDIO HEAD
+5dB
0dB
–20dB
–45dB
+10dB
0dB
–40dB
ATTENUATION
AMPLIFICATION
CONTROL CURRENT TO CCA
STANDARD LEVEL (0dB) DOES NOT CHANGE WHILE OTHER LEVELS ARE EXPANDED

Figure 6–59 Playback Input/Output Characteristic of CCA Circuit

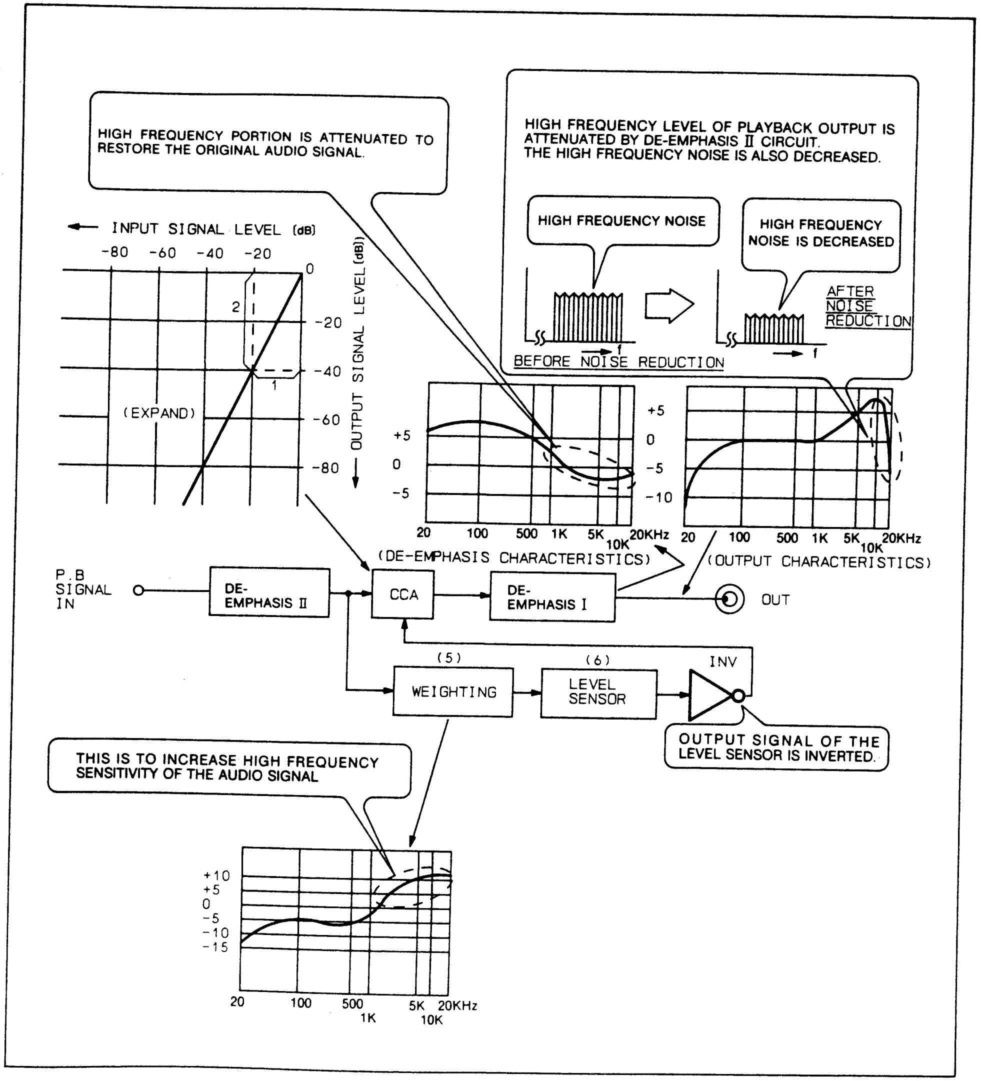

HIGH FREQUENCY PORTION IS ATTENUATED TO RESTORE THE ORIGINAL AUDIO SIGNAL.
HIGH FREQUENCY LEVEL OF PLAYBACK OUTPUT IS ATTENUATED BY DE-EMPHASIS II CIRCUIT. THE HIGH FREQUENCY NOISE IS ALSO DECREASED.
HIGH FREQUENCY NOISE
HIGH FREQUENCY NOISE IS DECREASED
AFTER NOISE REDUCTION
BEFORE NOISE REDUCTION
f
f
INPUT SIGNAL LEVEL (dB)
-80 -60 -40 -20
0
-20
-40
-60
-80
OUTPUT SIGNAL LEVEL (dB)
2
1
(EXPAND)
+5
0
-5
20 100 500 1K 5K 10K 20KHz
(DE-EMPHASIS CHARACTERISTICS)
+5
0
-5
-10
20 100 500 1K 5K 10K 20KHz
(OUTPUT CHARACTERISTICS)
P.B SIGNAL IN
DE-EMPHASIS II
CCA
DE-EMPHASIS I
OUT
(5)
(6)
INV
WEIGHTING
LEVEL SENSOR
OUTPUT SIGNAL OF THE LEVEL SENSOR IS INVERTED.
THIS IS TO INCREASE HIGH FREQUENCY SENSITIVITY OF THE AUDIO SIGNAL
+10
+5
0
-5
-10
-15
20 100 500 1K 5K 10K 20KHz

Figure 6–60

M. De-Emphasis (1)

The expanded audio signal from the CCA is then applied to the de-emphasis (1) circuit. This circuit provides the characteristic as shown in Figure 6-62.
As a results, the noise is reduced at the high frequency portion to improve the S/N ratio.

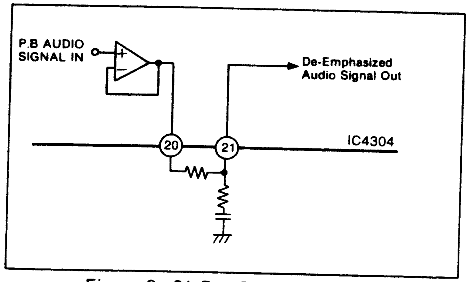

P.B AUDIO SIGNAL IN
De-Emphasized Audio Signal Out
IC4304
20
21

Figure 6—61 De—Emphasis I Circuit

N. HD Muting Circuit

This circuit produces the HD audio low at pin 12 of IC12 when drop-out or low level FM is occured at pin 10 of IC12.

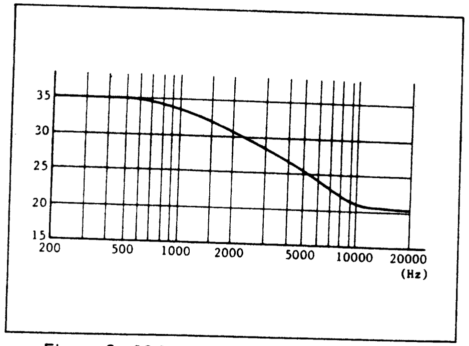


Figure 6—62 De—Emphasis I Characteristic

This low signal is sent to audio control circuit through inverter QR4304, QR4305 and Q4306 so that high is appeared at pin 4 of P4309.
(See Figure 6-63).

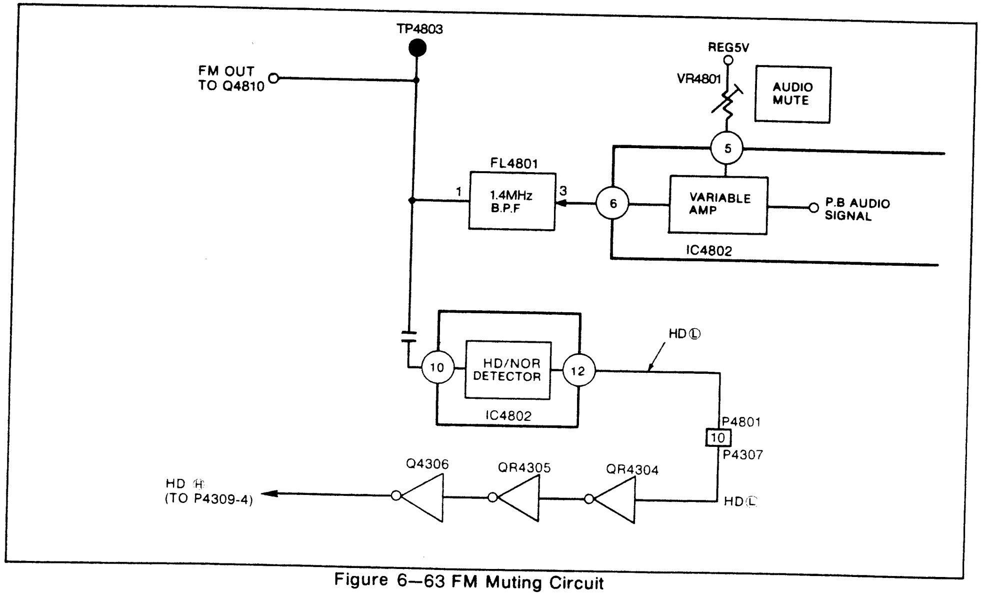

TP4803
FM OUT TO Q4810
REG5V
VR4801
AUDIO MUTE
5
FL4801
1
1.4MHz B.P.F
3
6
VARIABLE AMP
P.B AUDIO SIGNAL
IC4802
HD Ⓛ
10
HD/NOR DETECTOR
12
IC4802
P4801
10
P4307
Q4306
QR4305
QR4304
HD Ⓗ (TO P4309-4)
HD Ⓛ

Figure 6—63 FM Muting Circuit

6-6. Audio Output Circuit

1) Audio Output Select Circuit

The block diagram of audio output select circuit is shown in Figure 6-64.

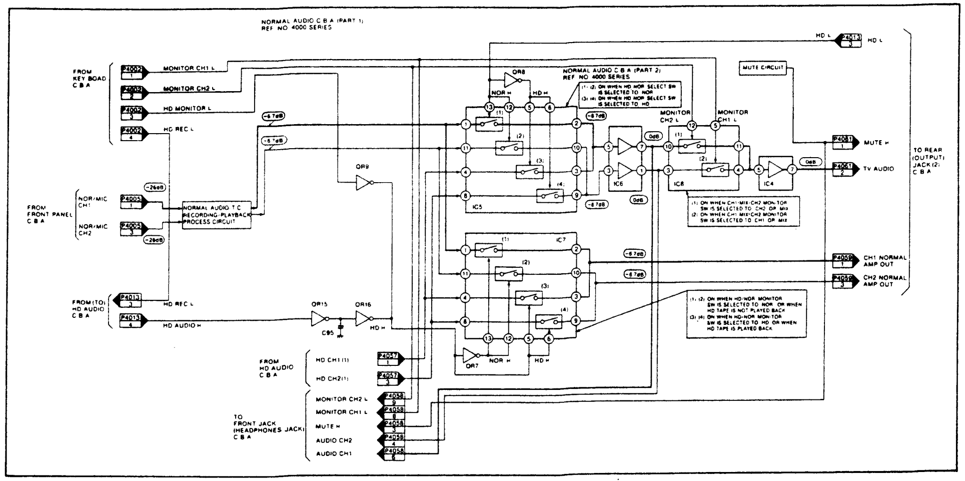

NORMAL AUDIO C.B.A (PART 1) REF. NO. 4000 SERIES
FROM KEY BOAD C.B.A
MONITOR CH1 L
MONITOR CH2 L
HD MONITOR L
HD REC L
NORMAL AUDIO C.B.A (PART 2) REF. NO. 4000 SERIES
MUTE CIRCUIT
FROM FRONT PANEL C.B.A
NOR/MIC CH1
NOR/MIC CH2
NORMAL AUDIO T.C RECORDING/PLAYBACK PROCESS CIRCUIT
IC5
IC6
IC8
IC4
IC7
MUTE H
TV AUDIO
TO REAR (OUTPUT) JACK(2) C.B.A
CH1 NORMAL AMP OUT
CH2 NORMAL AMP OUT
FROM(TO) HD AUDIO C.B.A
HD REC L
HD AUDIO H
FROM HD AUDIO C.B.A
HD CH1(1)
HD CH2(1)
TO FRONT JACK (HEADPHONES JACK) C.B.A
MONITOR CH2 L
MONITOR CH1 L
MUTE H
AUDIO CH2
AUDIO CH1

Figure 6—64 Block Diagram of Audio Output Select Circuit

2) Headphones Amplifier
(Headphone monitor channel selector)

This circuit selects the selected audio signals to be monitored to the headphones output, according to the setting of the monitor selector switch on the front panel.
This circuit also amplify the selected audio signals and controls the output levels through the use of the headphones level controller on the front panel.

The selected audio CH1 and CH2 signals are applied to IC6601 through pin 1 and 3. Switches inside of IC6601 receive the switching signal as shown in Figure 6-65, which correspond to the headphones jack and monitor switch setting. The audio signals are then sent to the headphones output amplifiers.
The selected audio signals are applied to amplifiers Q6603 and Q6604, and to the next amplifiers inside of IC6602, then to the headphones jack.

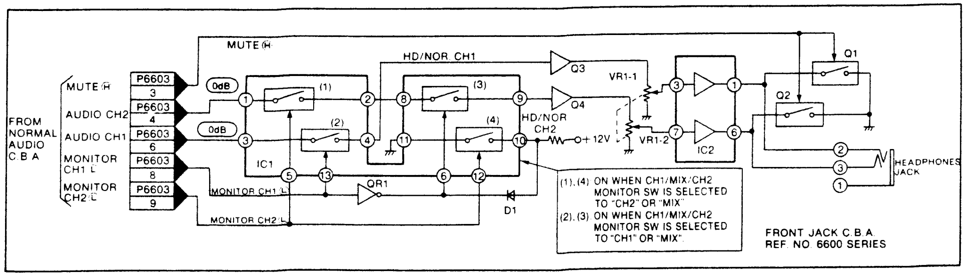

MUTE Ⓗ
HD/NOR CH1
Q3
Q1
VR1-1
FROM NORMAL AUDIO C.B.A
MUTE Ⓗ
P6603 3
AUDIO CH2
P6603 4
AUDIO CH1
P6603 6
MONITOR CH1 L
P6603 8
MONITOR CH2 L
P6603 9
0dB
0dB
(1)
(2)
(3)
(4)
Q4
Q2
HD/NOR CH2
+12V
VR1-2
IC1
IC2
QR1
D1
MONITOR CH1 L
MONITOR CH2 L
HEADPHONES JACK
(1), (4) ON WHEN CH1/MIX/CH2 MONITOR SW IS SELECTED TO "CH2" OR "MIX"
(2), (3) ON WHEN CH1/MIX/CH2 MONITOR SW IS SELECTED TO "CH1" OR "MIX"
FRONT JACK C.B.A REF. NO. 6600 SERIES

Figure 6—65 Head Phone Amp

3) Meter Amp Circuit

The selected audio signal from pin 7 of IC4006 is supplied to pin 3 of IC4011.
The selected audio is logarithmically compressed by IC4011 and then applied to the rectifier circuit witch consists D15, D16, C91. The output at the rectifier circuit is sent to the meter (+) side through CH1 METER ADJ. Control and connector P4060−1pin, P6303−1Pin.
The meter (−) side is then sent back through pin 2 of P6303, 4060 to the return circuit.

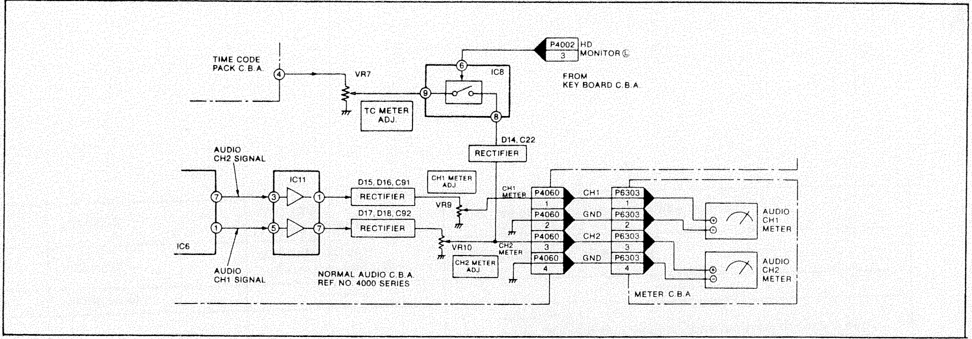
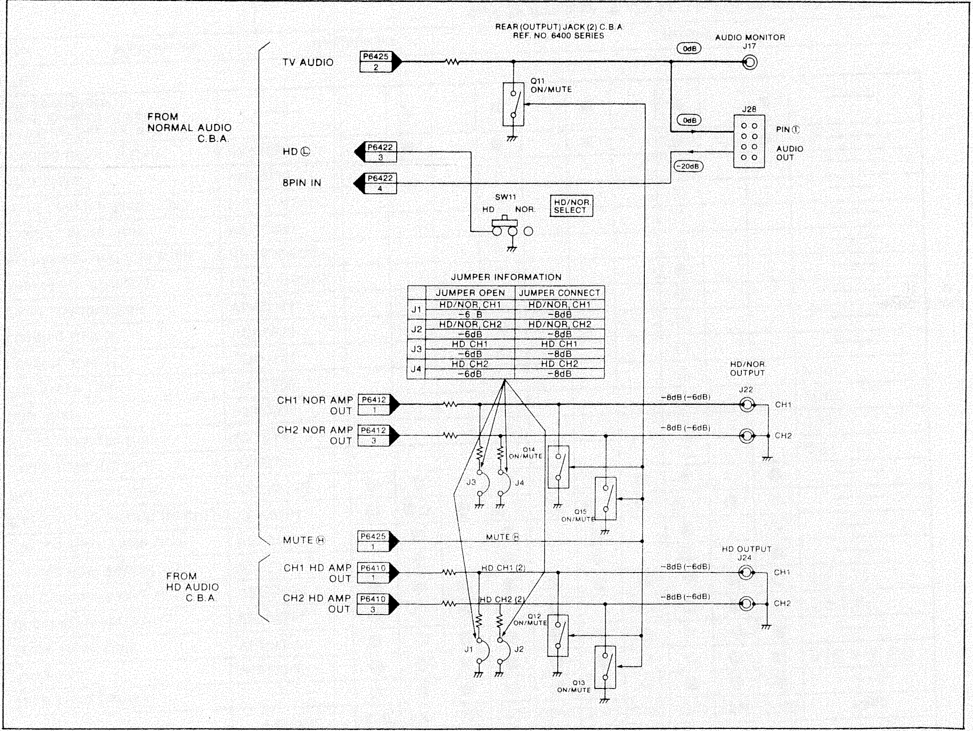

TIME CODE PACK C.B.A.
VR7
TC METER ADJ.
IC8
P4002 3
HD MONITOR Ⓛ
FROM KEY BOARD C.B.A.
D14, C22
RECTIFIER
AUDIO CH2 SIGNAL
IC11
D15, D16, C91
RECTIFIER
D17, D18, C92
RECTIFIER
CH1 METER ADJ
VR9
CH1 METER
VR10
CH2 METER
CH2 METER ADJ
IC6
AUDIO CH1 SIGNAL
NORMAL AUDIO C.B.A.
REF. NO. 4000 SERIES
P4060 1
P4060 2
P4060 3
P4060 4
CH1
GND
CH2
GND
P6303 1
P6303 2
P6303 3
P6303 4
AUDIO CH1 METER
AUDIO CH2 METER
METER C.B.A

Figure 6—66 Meter Circuit


REAR (OUTPUT) JACK (2) C.B.A
REF. NO. 6400 SERIES
FROM NORMAL AUDIO C.B.A.
TV AUDIO
P6425 2
Q11 ON/MUTE
0dB
AUDIO MONITOR J17
0dB
J28
PIN ①
AUDIO OUT
−20dB
HD Ⓛ
P6422 3
8PIN IN
P6422 4
SW11
HD
NOR.
HD/NOR SELECT
JUMPER INFORMATION
HD/NOR OUTPUT
CH1 NOR AMP OUT
P6412 1
CH2 NOR AMP OUT
P6412 3
−8dB (−6dB)
J22
CH1
CH2
Q14 ON/MUTE
J3
J4
Q15 ON/MUTE
MUTE Ⓗ
P6425 1
MUTE Ⓗ
FROM HD AUDIO C.B.A
HD OUTPUT J24
CH1 HD AMP OUT
P6410 1
HD CH1 (2)
CH2 HD AMP OUT
P6410 3
HD CH2 (2)
Q12 ON/MUTE
J1
J2
Q13 ON/MUTE

JUMPER INFORMATION

	JUMPER OPEN	JUMPER CONNECT
J1	HD/NOR, CH1	HD/NOR, CH1
	−6 B	−8dB
J2	HD/NOR, CH2	HD/NOR, CH2
	−6dB	−8dB
J3	HD CH1	HD CH1
	−6dB	−8dB
J4	HD CH2	HD CH2
	−6dB	−8dB

Figure 6—67 Audio Output Jacks

REGULAR MAINTENANCE

The purpose of periodic maintenance is to preserve the functioning of this machine throughout it's useful life. The user or service dealer should perform these maintenance regularly to ensure that maximum utility is obtained from the machine.

REGULAR MAINTENANCE IS NECESSARY

The VCR is a complicated piece of equipment. It contains many belts, rollers, heads etc., which become worn, and deteriorate as time goes by, causing trouble. Dust and dirt will also impede the proper functioning of the machine. In light of this, it is very important that overall maintenance be done according to the maintenance chart to maintain the functions of the VCR, and to avoid accidental problems. This maintenance should also be performed after any repairs are done on the equipment.

REGULAR MAINTENANCE IS RECOMMENDED

The VCR used for business applications requires particular attention for several reasons. The installation conditions and applications are not always the best. Long use times, or poor environmental conditions may adversely affect the lifespan and performance of the machine. Regular maintenance assures that the purchaser obtains the maximum value for his expenditure. Accordingly, the necessity of regular maintenance should be fully explained at the time of sale, as well as during after-sale repairs.

MAINTENANCE PARTS LOCATION

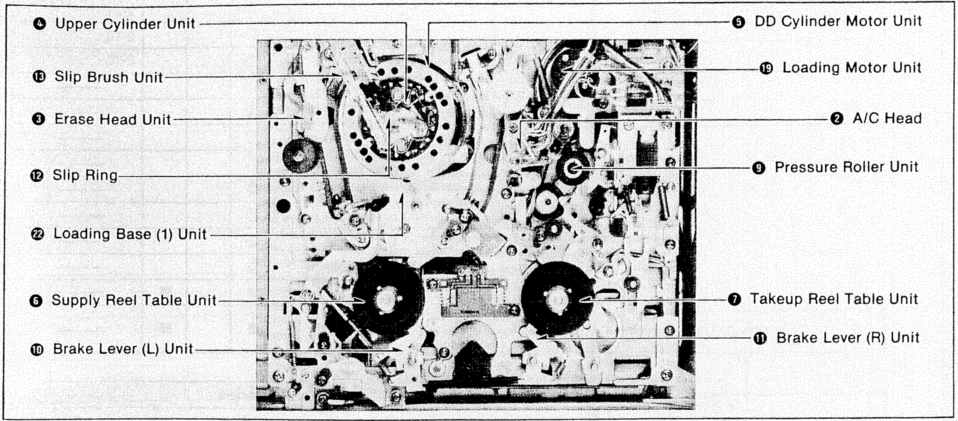

④ Upper Cylinder Unit
⑬ Slip Brush Unit
③ Erase Head Unit
⑫ Slip Ring
㉒ Loading Base (1) Unit
⑥ Supply Reel Table Unit
⑩ Brake Lever (L) Unit
⑤ DD Cylinder Motor Unit
⑲ Loading Motor Unit
② A/C Head
⑨ Pressure Roller Unit
⑦ Takeup Reel Table Unit
⑪ Brake Lever (R) Unit

Figure 1 Top View

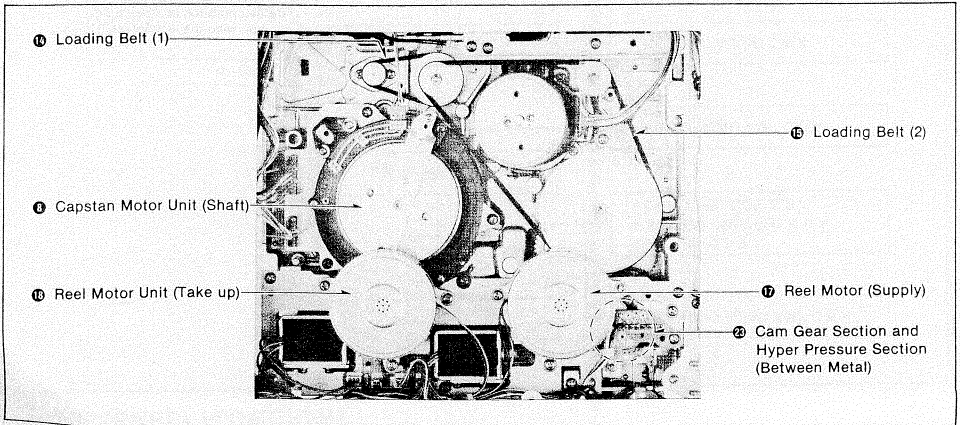

⑭ Loading Belt (1)
⑧ Capstan Motor Unit (Shaft)
⑱ Reel Motor Unit (Take up)
⑮ Loading Belt (2)
⑰ Reel Motor (Supply)
㉓ Cam Gear Section and Hyper Pressure Section (Between Metal)

Figure 2 Bottom View

MAINTENANCE CHART

The following periodic maintenance is required to prolong the life of the machine.
Since the parts are keyed to the Inner Parts Location Diagram, when you replace the following parts, refer to the diagram.

	Parts Name	Unit or Part No.	Hour										Page
			500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
❶	Tape Transporters	———	●	●	●	●	●	●	●	●	●	●	———
❷	A/C Head	VBR0069	●	●	●	●	●	●	●	◎	●	●	2-15, 2-16, 2-17
❸	Erase Head Unit	VBS0024	●	●	●	●	●	●	●	◎	●	●	———
❹	Upper Cylinder Unit	VEH0344	●	◎	●	◎	●	◎	●	◎	●	◎	2-9, 2-10
❺	DD Cylinder Motor Unit	VEG0481	●	●	●	●	●	●	●	●	●	◎	2-9, 2-10
❻	Supply Reel Table Unit	VXR0113		●		●		●		●		●	———
❼	Takeup Reel Table Unit	VXR0113		●		●		●		●		●	———
❽	Capstan Motor Unit (Shaft)	VEM0164	●	●△	●	●△	●	●△	●	●△	●	◎	———
❾	Pressure Roller Unit	VXG0013S	●	●	◎	●	●	◎	●	●	◎	●	———
❿	Brake Lever (L) Unit	VXZ0148				◎				◎			2-21
⓫	Brake Lever (R) Unit	VXZ0149				◎				◎			2-21
⓬	Slip Ring	VSA0038				◎				◎			2-10
⓭	Slip Brush Unit	VXA1508				◎				◎			2-10
⓮	Loading Belt (1)	VDV0122				◎				◎			———
⓯	Loading Belt (2)	VDV0135				◎				◎			———
⓰	Front Loading Belt	VDV0144				◎				◎			———
⓱	Reel Motor (Supply)	KFN56DB3AS				◎				◎			———
⓲	Reel Motor Unit (Take up)	KFN56DB3AT				◎				◎			———
⓳	Loading Motor Unit	VEM0135								◎			———
⓴	Front Loading Motor Unit	MXN12AE10C				◎				◎			———
㉑	Hour Meter	VSE0036				◎				◎			———
㉒	Loading Base (1) Unit	VXA1334		■		■		■		■		■	———
㉓	Cam Gear Section and Hyper Pressure Section (Between Metal)	———		■		■		■		■		■	———

*** NOTE:**

Symbol	Maintenance	Requirement	Remark
●	Cleaning	Freon TF, Ethyl-alcohol or Cleaning Liquid (Purchase locally)	Wipe dirt from the parts using soft cloth impregnated with Freon TF or Ethyl-Alcohol. Note: When cleaning rubber parts, avoid using excessive alcohol since it may accelerate deterioration of these parts. After cleaning with alcohol, wipe the alcohol quickly and thoroughly.
◎	Replacement	———	———
△	Lubrication	High Quality Spindle Oil (Purchase locally)	Supply one or two drops of oil.
■	Greasing	Molytone Grease (MOR265)	Wipe the old grease and apply new grease.

DISASSEMBLY PROCEDURES

1. DISASSEMBLY FLOWCHART

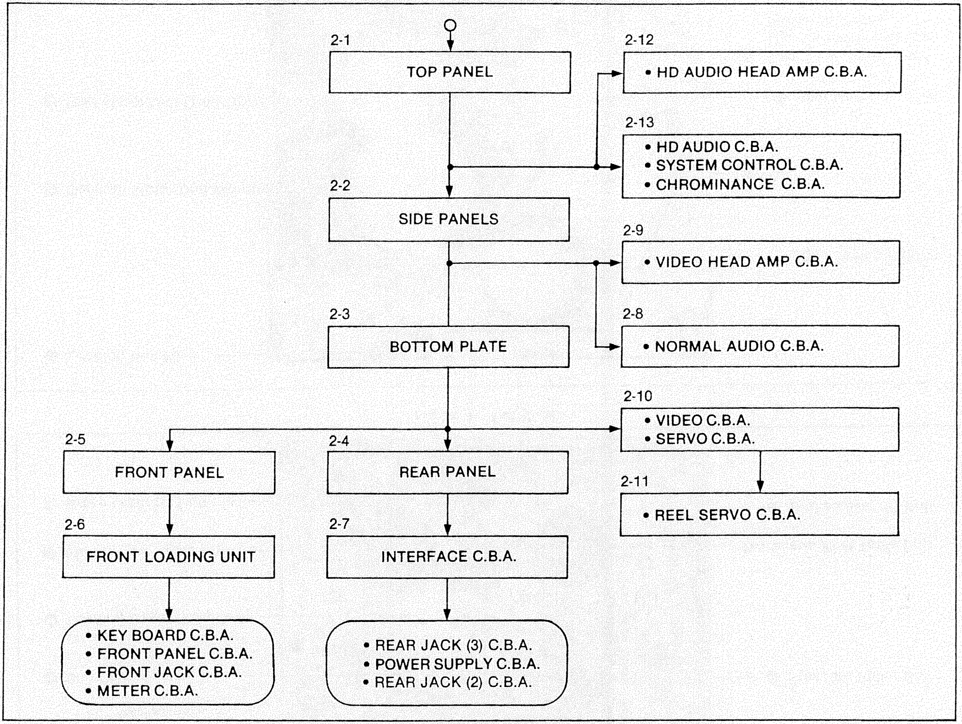

2-1
TOP PANEL
2-12
• HD AUDIO HEAD AMP C.B.A.
2-13
• HD AUDIO C.B.A.
• SYSTEM CONTROL C.B.A.
• CHROMINANCE C.B.A.
2-2
SIDE PANELS
2-9
• VIDEO HEAD AMP C.B.A.
2-3
BOTTOM PLATE
2-8
• NORMAL AUDIO C.B.A.
2-10
• VIDEO C.B.A.
• SERVO C.B.A.
2-5
FRONT PANEL
2-4
REAR PANEL
2-11
• REEL SERVO C.B.A.
2-6
FRONT LOADING UNIT
2-7
INTERFACE C.B.A.
• KEY BOARD C.B.A.
• FRONT PANEL C.B.A.
• FRONT JACK C.B.A.
• METER C.B.A.
• REAR JACK (3) C.B.A.
• POWER SUPPLY C.B.A.
• REAR JACK (2) C.B.A.

Figure D1

The above flow chart describes the order of steps for removing the cabinet parts and certain printed circuit boards in order to gain access to the items needing servicing. To reassemble the unit, follow the steps in reverse order.

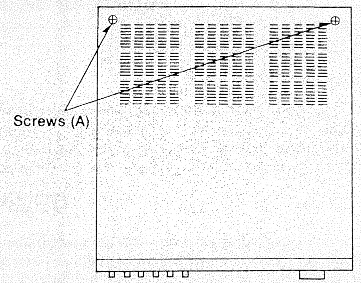


Figure D2

2. DETAILED DISASSEMBLY METHOD

2–1. Removal of the Top Panel

1. Unscrew the 2 screws (A) on the Top Panel. (Figure D2)
2. Carefully lift the rear of the case and slide it off the back of the unit.

2–2. Removal of the Side Panels

1. Unscrew the 8 screws (B) on the Side Panels. (Figure D3)
2. Lift off the Side Panels.

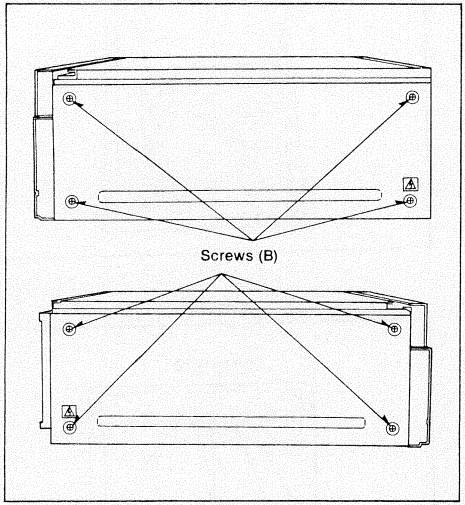


Figure D3

2–3. Removal of the Bottom Plate

1. Unscrew the 9 screws (C) with sawtooth washer.
2. Lift off the Bottom Plate.

Note:
Do not remove the 4 rubber feet.

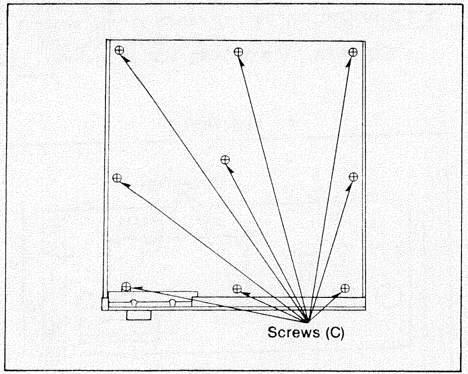


Figure D4

2–4. Removal of the Rear Panel

1. Unscrew the 6 screws (D) and earth screw with cable on the rear panel. (Figure D5)
2. Lift the Rear Panel and carefully pull the panel off the unit.

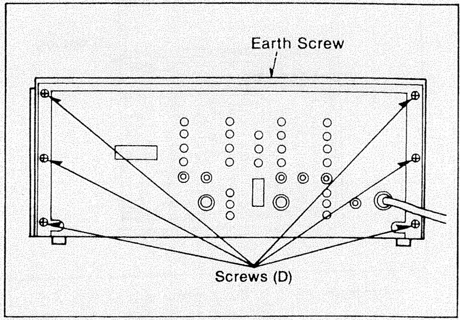


Figure D5

2–5. Removal of the Front Panel

1. Unscrew the 4 screws (E) on the side angles and the 2 screws (F) on the bottom of the Front Panel. (Figures D6 and D7)
2. Lift the Front Panel and carefully pull the panel off from the unit as shown in Figure D8.

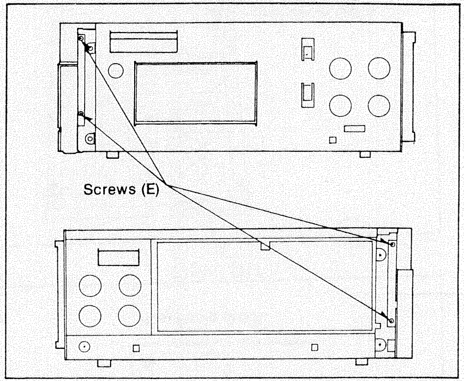


Figure D6

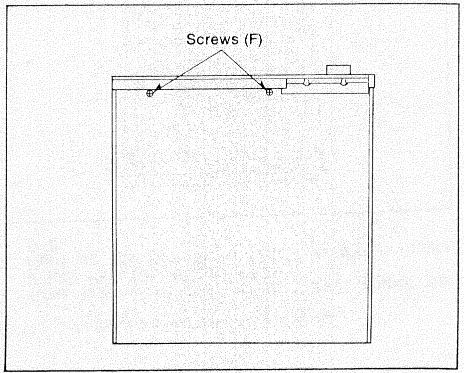


Figure D7

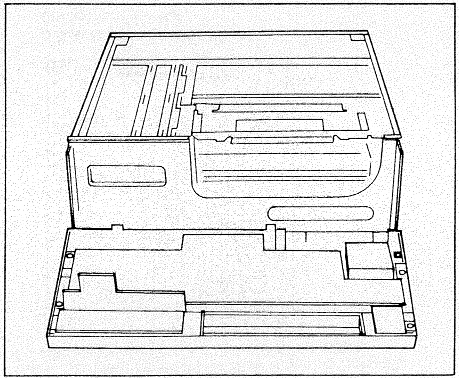


Figure D8

2–6. Removal of the Front Loading Unit

1. Unscrew the 4 screws (G) on the Front Loading Unit. (Figure D9)
2. Carefully lift the Front Loading Unit out.

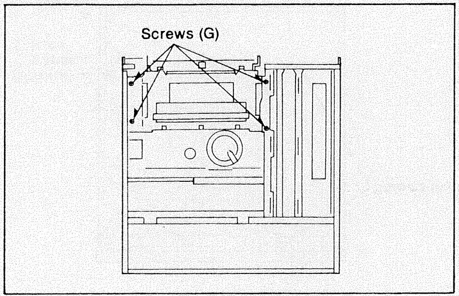


Figure D9

2–7. Opening of the Interface C.B.A.

1. Unlock the 2 lock pins (H) (Figure D10) and open up the interface C.B.A. as shown Figure D11.

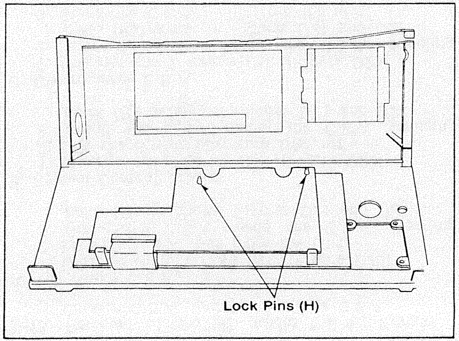


Figure D10

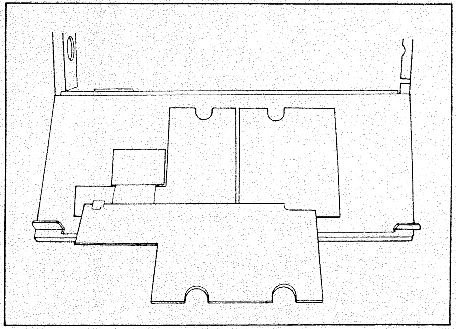


Figure D11

2–8. Opening of the Normal Audio C.B.A.

1. Unscrew the 3 screws (I) on the Normal Audio C.B.A. (Figure D12) and open up the C.B.A. as shown Figure D13.

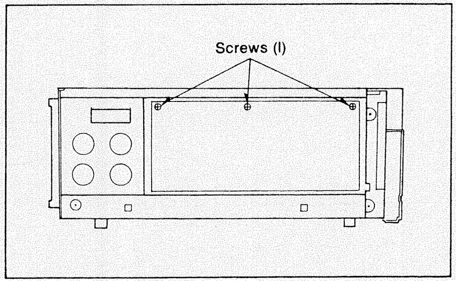


Figure D12

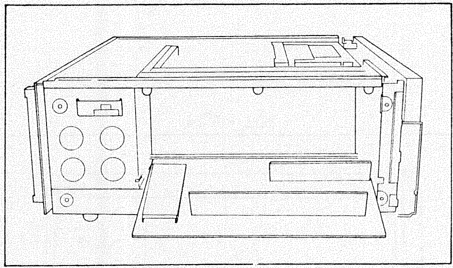


Figure D13

2–9. Removing of the Video Head Amp C.B.A.

1. Unscrew the 4 screws (J) on the Video Head Amp C.B.A. (Figure D14) and carefully pull out the C.B.A. from the unit.

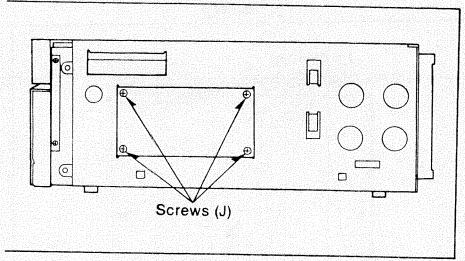


Figure D14

–10. Opening of the Servo C.B.A., Video C.B.A. and Reel Servo C.B.A.

. Unscrew the 5 screws (K) on the bottom C.B.A. (Figure D15)

: Open up the bottom C.B.A. as shown Figure D16.

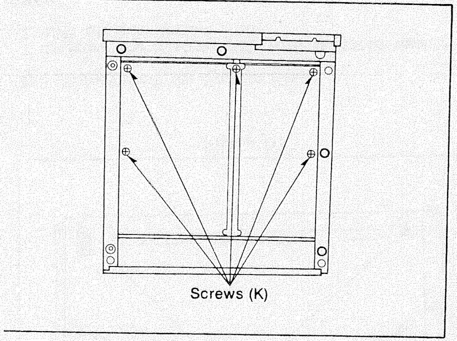


Figure D15

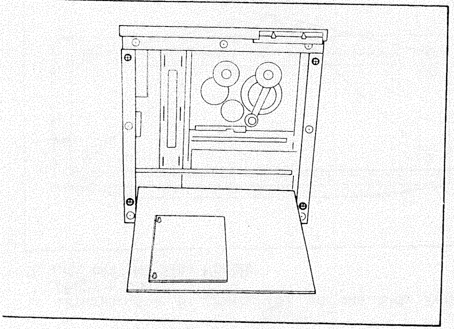


Figure D16

2–11. Opening of the Reel Servo C.B.A.

1. After opening of the bottom C.B.A., unlock the 2 lock Pins (L). (Figure D17)
2. Open up the Reel Servo C.B.A. as shown Figure D18.

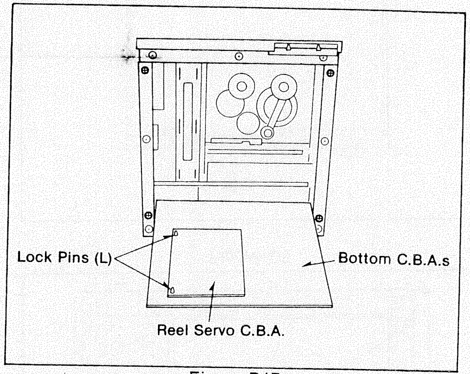

Lock Pins (L)
Bottom C.B.A.s
Reel Servo C.B.A.

Figure D17

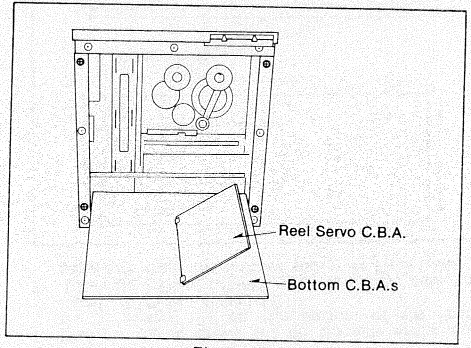

Reel Servo C.B.A.
Bottom C.B.A.s

Figure D18

2–12. Removal of the HD Audio Head Amp C.B.A.

1. Unscrew the 2 screws. (Figure D19)
2. Lift the HD Audio Head Amp C.B.A. Carefully.

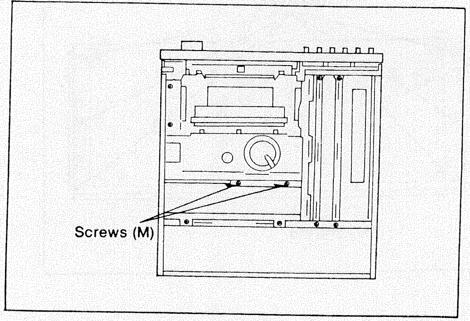


Figure D19

2–13. Removal of the HD Audio C.B.A., System Control C.B.A. and Chrominance C.B.A.

A. HD Audio C.B.A.
1. Unscrew the 2 screws (N). (Figure D20)
2. Lift the C.B.A. out from the unit.
3. Stand the C.B.A. using the C.B.A. standing holes (Q) as shown Figures D21 and D22.

B. System Control C.B.A.
1. Unscrew the 2 scrws (O). (Figure D20)
2. Lift the C.B.A. out from the unit.
3. Stand the C.B.A. using the C.B.A. standing holes (R) as shown Figures D21 and D22.

C. Chrominance C.B.A.
1. Unscrew the 2 screws (P). (Figure D20)
2. Lift the C.B.A. using the C.B.A. standing holes (P) as shown Figures D21 and D22.
3. Stand the C.B.A. out from the unit.

* Note:
To prevent the C.B.A. damage or shock hazard, please pay attention when the C.B.A. in standed as shown in Figure D22.

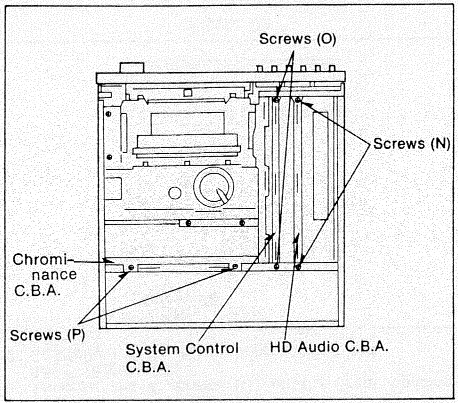

Screws (O)
Screws (N)
Chromi-nance C.B.A.
Screws (P)
System Control C.B.A.
HD Audio C.B.A.

Figure D20

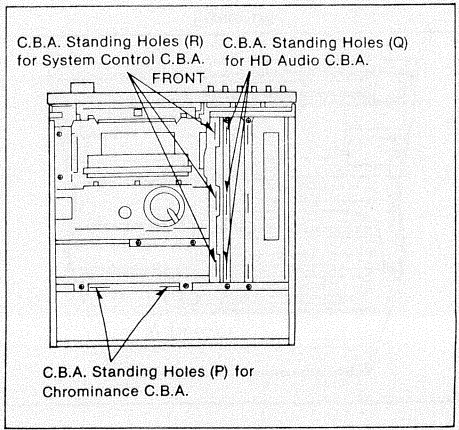

C.B.A. Standing Holes (R) for System Control C.B.A.
C.B.A. Standing Holes (Q) for HD Audio C.B.A.
FRONT
C.B.A. Standing Holes (P) for Chrominance C.B.A.

Figure D21

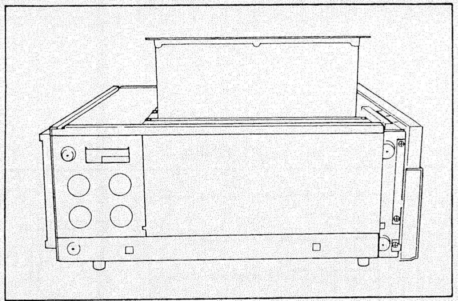
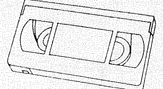
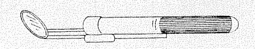
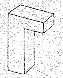
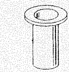
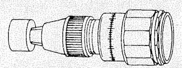
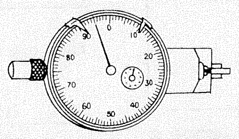
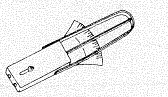
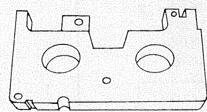
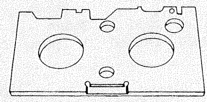
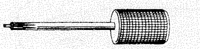
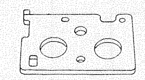
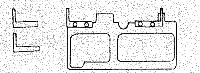
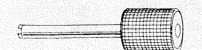
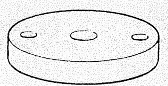
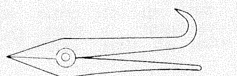
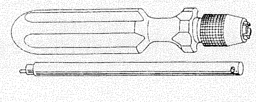
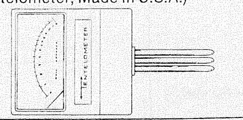
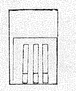
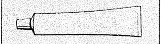
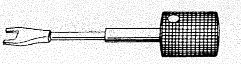
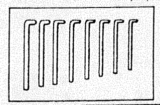


Figure D22

MECHANICAL ADJUSTMENT PROCEDURES

The regular maintenance is important to maintain the inital specification of the deck and to prevent tape damage.
The specified servicing fixture must be used to conduct adjustment requiring a servicing fixture.
The following fixtures, tools and measuring equipments are required to conduct complete Mechaninical Adjustments.

1. SERVICING FIXTURES & TOOLS

VFM8180HMDH VHS Alignment Tape  Refer to Technical Information order No. VRD-TS-409-1	VFK0343 Check Light 	VFK0344 Post Height Adjustment Fixture (P_1) VFK0345 Post Height Adjustment Fixture (P_4)  VFK0344  VFK0345
VFK0133 (Dial Torque Gauge) VFK0134 (Plastic Clamper Only) VFK0180 Adaptor for VFK0133 	VFK0190 Reel Table Height Fixture 	VFK66 Fan Type Tension Gauge 
VFK0135 Eccentric Screwdriver	VFK0188 Cassette Holder Fixture 	VFK0191 Post Adjustment Plate 
VFK0330 Fine Adjustment Screwdriver (3mmφ) 	VFK0187 Tension Post Adj. Fixture 	VFK0236 Tension Post Adj. Plate VFK0394 FWD Sensor Adj. Fixture VFK0393 REV Sensor Adj. Fixture 
VFK0329 Post Adjustment Screwdriver 	VFK0243 Slip Ring Fixture 	VFK0335 Retaining Ring Remover (3mm/4mm) 
VFK0192 Eccentric Screwdriver 	VFK0132 Back Tension Meter (Tentelometer, Made in U.S.A.) 	VFK27 Head Cleaning Stick  MOR265 Morlytone Grease (Cam Gear, Slide Selection, Hyper Pressure Section etc.) 
VFK0328 H-Position Adj. Fixture 	VFK0326 Hex. Wrench (Set) (0.7, 0.9, 1.2, 1.5, 1.6, 2, 2.4, 3mm) 	Height Quality Machine Oil <Purchase Locally> (Reel Shaft. Capstan Saft etc.) Cleaning Liquid (Freon TF., Alchol) <Purchase Locally> (Tape Transport Rubber Parts etc.)

2. CYLINDER MAINTENANCE PROCEDURES

2-1. REPLACEMENT OF THE UPPER CYLINDER UNIT

1. Remove the Top Panel, and Front Loading Unit. (Refer to the Disassembly Method)
2. Unscrew the screw (A) securing the Brush Unit and remove the Brush Unit. (Figure M1)
3. Unscrew the 2 screws (B) securing the Slip Ring to the Upper Cylinder Unit. (Figure M1)
4. Unsolder the 3 Slip Ring leads from the Head Relay Board, then remove the Slip Ring. (Figure M1)
5. Unsolder the 12 Cylinder leads from the Head Relay Board then unscrew the 2 screws (C) and remove the Upper Cylinder Unit. (Figure M1 and M2)
6. Place the new upper cylinder unit on the lower cylinder unit so that the screw holes match. (Figure M1)
7. Tighten the 2 screws (C).
8. Solder the 12 Cylinder leads to the Head Relay Board. Be sure the wire colors and direction mark as shown in Figures M1 and M2 are matched up properly.
9. Reinstall the Slip Ring Unit on the Upper Cylinder Unit and tighten the 2 screws (B), as shown Figure M1, then solder the 3 Slip Ring leads to the Head Relay Board.
   Be sure the wire colors are matched up properly as shown Figure M2.
10. Reinstall the Brush Unit on the Brush Fixing Base and tighten the 2 screws (A). (Figure M1)
11. Adjust the brush tension. (Refer to the Adjustment of the Brush Tension)

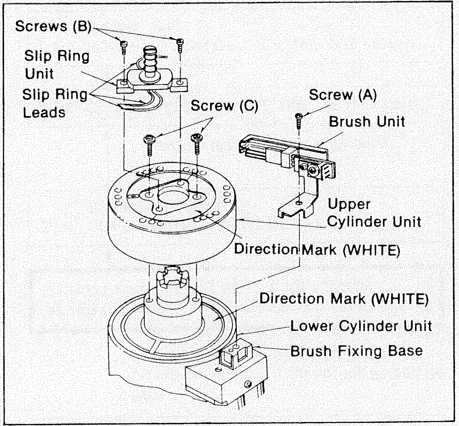


Figure M1 Cylinder Exploded View

2-2. REPLACEMENT OF THE DD CYLINDER UNIT

Work with extreme care when removing or replacing the DD cylinder unit. Do not touch video heads during servicing.

1. Remove the Top Case, Cassette Compartment, Bottom Case and open up the Bottom Circuit Boards.
   Refer to "DISASSEMBLY METHOD" section.
2. Disconnect the DD Cylinder Connector and unscrew the 3 screws (A). Since there is very little clearance between DD cylinder and chassis, remove the cylinder gently and carefully. (Figure M3)

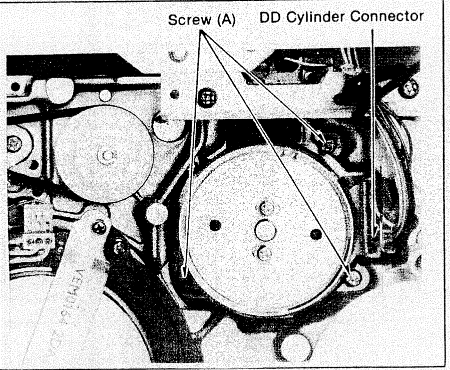
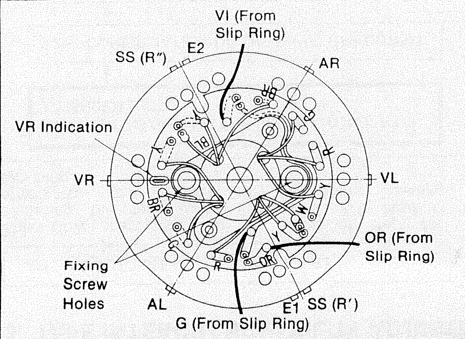


Figure M3 Replacement of the DD Cylinder Unit



LEAD WIRES	
REF.	COLOUR
BR	BROWN
G	GRAY
R	RED
OR	ORANGE
Y	YELLOW
W	WHITE
BL	BLUE
VI	VIOLET

HEAD	
REF.	TYPE
VR	VIDEO (R)
VL	VIDEO (L)
SS (R′)	SS VIDEO (R′)
SS (R″)	SS VIDEO (R″)
AR′	AUDIO (R)
AL	AUDIO (L)
E1	FLYING ERASE (1)
E2	FLYING ERASE (2)

Figure M2 Upper Cylinder and Lead Wires

3. Reinstall the new DD cylinder unit to the chassis and reconnect the DD Cylinder Connection.

Note:
Upon completion of replacement, confirm the performance. And if any further maintenance is required, refer to the "TAPE INTERCHANGEABILITY ADJUSTMENT" section and perform the necessary items.

2-3. ADJUSTMENT OF THE BRUSH TENSION

- * Note:
  This adjsutment should be performed after the reinstallation of the Brush Unit.
- * Equipment Required
  Srip Ring Jig............................VFK0243

1. Set the slip ring and tighten the screws (F) tentatively. Then insert the Slip Ring Jig. (Figure M4)

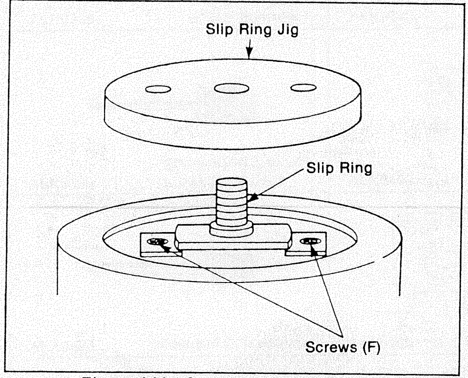

Slip Ring Jig
Slip Ring
Screws (F)

Figure M4 Setting of Slip Ring–(1)

2. Tighten the screws (F) and remove the Slip Ring Jig. (Figures M4 and M5)

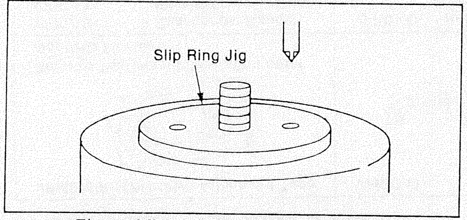

Slip Ring Jig

Figure M5 Setting of Slip Ring–(2)

3. Set the brush unit and tighten the screw (E). (Figure M6)

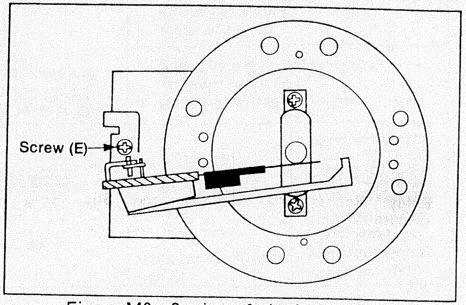


Figure M6 Setting of the Brush Unit

4. Adjust the brush pressure. Turn the screw (H) clockwise by 1 1/2 turns +− 30degrees, after just touching the brush to the slip ring. (Figure M7)

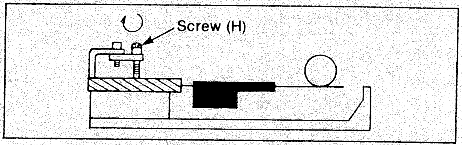


Figure M7 Adjustment of Brush Unit

2-4. PROCEDURE FOR CLEANING OF CYLINDER UNIT

1. Position the video head to permit access for cleaning and hold the upper cylinder to keep it from turning while cleaning.
2. Gently rub the video head in direction of tape travel with Head Cleaning Stick moistened with Freon TF.
3. Repeat for the other heads. (Figure M8)

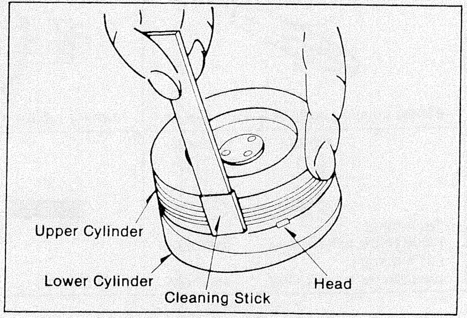

Upper Cylinder
Lower Cylinder
Cleaning Stick
Head

Figure M8 Head Cleaning

Notes:
1. Do not rub vertically.
2. Do not apply any pressure to head.
   If contaminant is not easily removed, continued gentle wiping will usually remove the substance.
3. Do not rotate the Upper Cylinder Unit clockwise when cleaning it.

3. TAPE INTERCHANGEABILITY ADJUSTMENT PROCEDURES

3-1. ADJUSTMENT FLOW CHART

This flow chart describes the order of steps for adjusting the tape guide posts and A/C head in order to gain access to the items needing servicing.

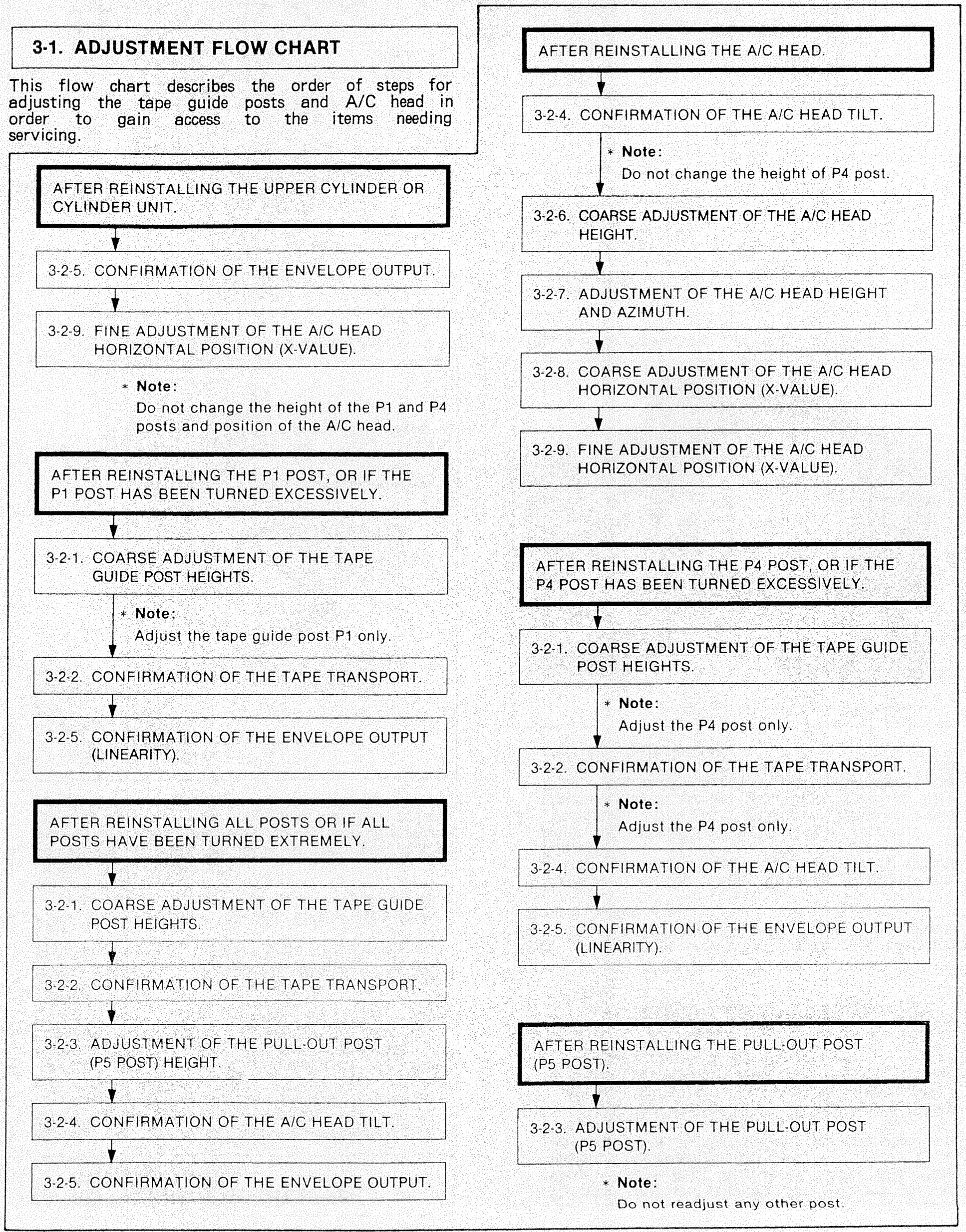

AFTER REINSTALLING THE UPPER CYLINDER OR CYLINDER UNIT.
3-2-5. CONFIRMATION OF THE ENVELOPE OUTPUT.
3-2-9. FINE ADJUSTMENT OF THE A/C HEAD HORIZONTAL POSITION (X-VALUE).
* Note:
Do not change the height of the P1 and P4 posts and position of the A/C head.
AFTER REINSTALLING THE P1 POST, OR IF THE P1 POST HAS BEEN TURNED EXCESSIVELY.
3-2-1. COARSE ADJUSTMENT OF THE TAPE GUIDE POST HEIGHTS.
* Note:
Adjust the tape guide post P1 only.
3-2-2. CONFIRMATION OF THE TAPE TRANSPORT.
3-2-5. CONFIRMATION OF THE ENVELOPE OUTPUT (LINEARITY).
AFTER REINSTALLING ALL POSTS OR IF ALL POSTS HAVE BEEN TURNED EXTREMELY.
3-2-1. COARSE ADJUSTMENT OF THE TAPE GUIDE POST HEIGHTS.
3-2-2. CONFIRMATION OF THE TAPE TRANSPORT.
3-2-3. ADJUSTMENT OF THE PULL-OUT POST (P5 POST) HEIGHT.
3-2-4. CONFIRMATION OF THE A/C HEAD TILT.
3-2-5. CONFIRMATION OF THE ENVELOPE OUTPUT.
AFTER REINSTALLING THE A/C HEAD.
3-2-4. CONFIRMATION OF THE A/C HEAD TILT.
* Note:
Do not change the height of P4 post.
3-2-6. COARSE ADJUSTMENT OF THE A/C HEAD HEIGHT.
3-2-7. ADJUSTMENT OF THE A/C HEAD HEIGHT AND AZIMUTH.
3-2-8. COARSE ADJUSTMENT OF THE A/C HEAD HORIZONTAL POSITION (X-VALUE).
3-2-9. FINE ADJUSTMENT OF THE A/C HEAD HORIZONTAL POSITION (X-VALUE).
AFTER REINSTALLING THE P4 POST, OR IF THE P4 POST HAS BEEN TURNED EXCESSIVELY.
3-2-1. COARSE ADJUSTMENT OF THE TAPE GUIDE POST HEIGHTS.
* Note:
Adjust the P4 post only.
3-2-2. CONFIRMATION OF THE TAPE TRANSPORT.
* Note:
Adjust the P4 post only.
3-2-4. CONFIRMATION OF THE A/C HEAD TILT.
3-2-5. CONFIRMATION OF THE ENVELOPE OUTPUT (LINEARITY).
AFTER REINSTALLING THE PULL-OUT POST (P5 POST).
3-2-3. ADJUSTMENT OF THE PULL-OUT POST (P5 POST).
* Note:
Do not readjust any other post.

Figure M9 Tape Interchangeability Adjustment Flow Chart

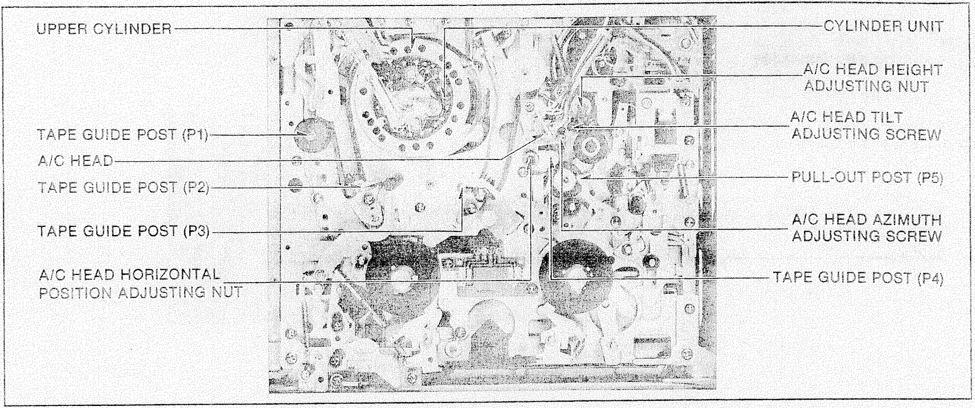

UPPER CYLINDER
CYLINDER UNIT
A/C HEAD HEIGHT ADJUSTING NUT
TAPE GUIDE POST (P1)
A/C HEAD TILT ADJUSTING SCREW
A/C HEAD
TAPE GUIDE POST (P2)
PULL-OUT POST (P5)
TAPE GUIDE POST (P3)
A/C HEAD AZIMUTH ADJUSTING SCREW
A/C HEAD HORIZONTAL POSITION ADJUSTING NUT
TAPE GUIDE POST (P4)

Figure M10

3-2. ADJUSTMENT PROCEDURES

3-2-1. COARSE ADJUSTMENT OF THE TAPE GUIDE POST HEIGHTS (P1, P2, P3 AND P4)

* Equipment Required:
Post Adjsutment Plate....................VFK0191
Reel Table Height Fixture...............VFK0190
Nut Driver (Purchase locally)
Post Adjustment Screwdriver.............VFK0329

1. Remove the Top Panel and the Front Loading Unit.
2. Place the Post Adjustment Plate over the reel tables. (Figure M11)
   Confirm that the Post Adjustment Plate is firmly seated.

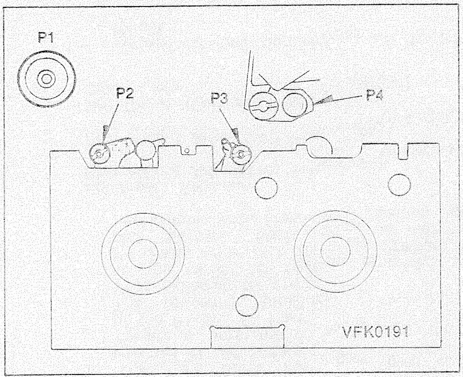

P1
P2
P3
P4
VFK0191

Figure M11

3. Remove the post cap on post P4.
4. Lower all 4 tape guide posts so that the lower tape guide on each post is below the top surface of the adjustment plate. Use the Post Adjustment screwdriver to lower posts P2 and P3, and the Nut Driver to lower posts P1 and P4.
5. Place the Reel Table Height Gauge on the Post Adjustment Plate and lower the scraper so that it touches the plate. (Figure M12)

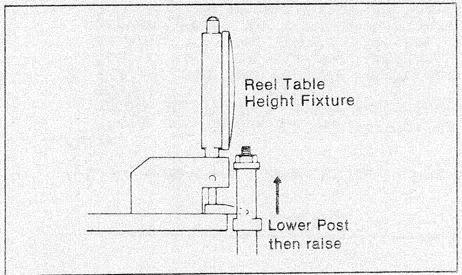

Reel Table Height Fixture
Lower Post then raise

Figure M12

6. Place the side of the scraper against the each post as shown in Figure MS, set the gauge to zero, then slowly raise the post until the lower tape guide just touches the bottom of the scraper. Use the gauge to determine the exact point at which the lower tape guide touches the scraper. (Figure M13)

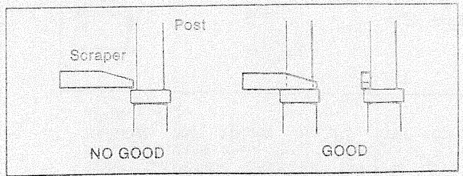

Post
Scraper
NO GOOD
GOOD

Figure M13

3-2-2. CONFIRMATION OF THE TAPE TRANSPORT (TAPE GUIDE POSTS)

* Note:
1. The tape guide posts have been precisely adjusted at the factory. Therefore, normally do not change the height of P1 and P4 posts. The following adjustment is required only when replacing the posts.
2. If curling is apparent proceed to the P4 post, wipe dirt from the pressure roller and capstan shaft using a soft cloth impregnated with Freon TF or cleaning liquid.
3. The adjustment of the post height is required only the one which has been replaced.

* Equipment Required:
Post Adjustment Screwdriver.............VFK0329
Check Light.............................VFK0343
Nut Driver (Purchase locally)

1. To prevent the alignment tape from being damaged, use a normal cassette tape for this procedure.
   Playback the normal cassette tape and confirm that the tape travels without any curling at the edges of all the posts by using the check light. (Figures M14 and M15)

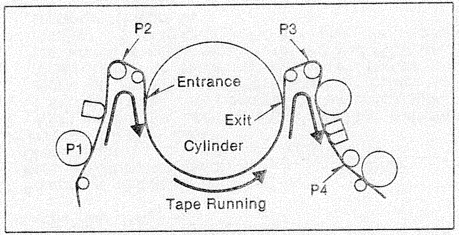

P2
P3
Entrance
Exit
P1
Cylinder
P4
Tape Running

Figure M14 Tape Transport Posts

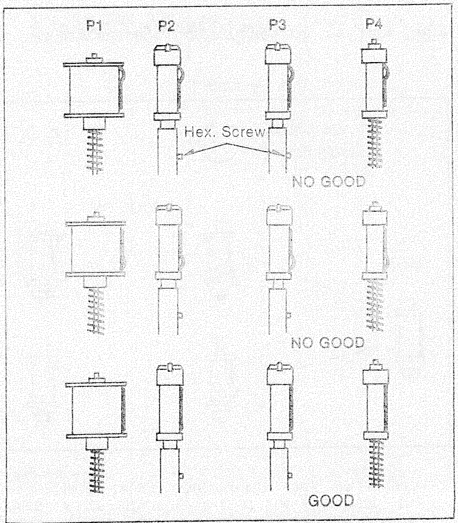

P1
P2
P3
P4
Hex. Screw
NO GOOD
NO GOOD
GOOD

Figure M15 Tape Guide Posts

2. If curling is apparent, adjsut the height of posts by turning the top of post with the post adjustment screwdriver (Posts P2 and P3) or the nut driver (Posts P1 and P4). (Figures M14 and M15)
3. After adjusting the P4 post, adjustment of the pull-out post (P5) is required.
   (Refer to "ADJUSTMENT OF THE PULL-OUT POST HEIGHT".)
4. If the tape curling cannot be corrected by adjusting the tape guide posts, then adjustment of the A/C head tilt may be needed.

3-2-3. ADJUSTMENT OF THE PULL-OUT POST (P5 POST) HEIGHT

* Notes:
1. This adjustment should be performed only after adjusting tape guide post P4 as the height of the pull-out post is based on the height of post P4.
2. This adjustment should be performed with the unit in the loading-completion mode.
3. When replacing or adjusting the pull-out post, unplug the unit from the power source.

* Tools and Equipment Required:
Post Adjsutment Plate...................VFK0191
Reel Table Height Fixture...............VFK0190
Check Light.............................VFK0343
Nut Driver (Purchase locally)

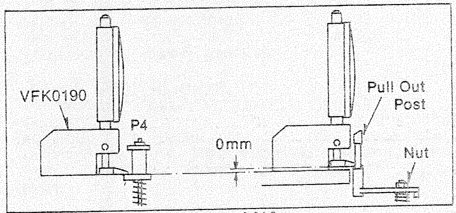

VFK0190
P4
0mm
Pull Out Post
Nut

Figure M16

1. Remove the Top Panel and the Front Loading Unit.
2. Turn the power switch on.
3. Insert a cassette tape to the Cassette Compartment, then press the play button. This simulates the loading completion mode.
4. Unplug the unit from the power source.
5. Place the Post Adjustment plate over the reel tables.
6. Place the Reel Table Height Gauge on the tape guide post P4, lower the scraper so that it touches the lower edges of P4, then set the gauge to zero ("0). (Figure M16)
7. Slightly lower the pull-out post by turning the nut on the post clockwise with the nut driver, and set the side of the scraper against the post as shown in Figure M17.
8. Slowly turn the nut on the post counterclockwise until the gauge reads 0mm. (Figure M16)
9. Confirm there is no tape curling at P4 post during x10 reverse mode by using the check light.
   If tape curling occurs, back to step 8.

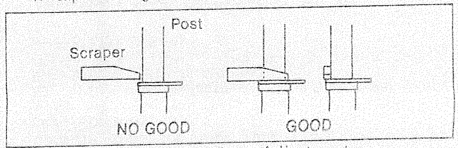

Post
Scraper
NO GOOD
GOOD

Figure M17 Post Adjustment

INTRODUCTION OF THE NEW PROCEDURES FOR TAPE ADJUSTMENT AND CONFIRMATION OF THE POSTS HEIGHTS WITH NEW FIXTURE AND TOOLS

1. Adjustment and Confirmation of the Heights of the Tape Guide Posts P1 and P4

* Note:
1. The Tape Guide Posts have been precisely adjsuted at the factory.
Therefore, normally do not change the hight of the P1 and P4 Posts.
The following adjustment is required only when replacing the posts.
2. If the curling is apparent proceeded to the P4 Post, wipe dirt from the Pressure Roller and Capstan Shaft using a soft cloth impregnated with Freon TF or cleaning liquid.

* Equipment Required:
Post Height Adjustment Fixture (P1) VFK0344
Post Height Adjustment Fixture (P4) VFK0345
Not Driver (Purchase Locally)
Check Light..............................VFK0343

1-1. Adjustment and Confirmation of the P1 Post Height

1. Remove the Top Panel and the Front Loading Unit.
2. Set the P1 Post Height Adjustment Fixture as shown in Figure 1.

* Note:
The P1 Post Height Adjustment Fixture must be set on the Polished Portion of Chassis near the P1 Post.

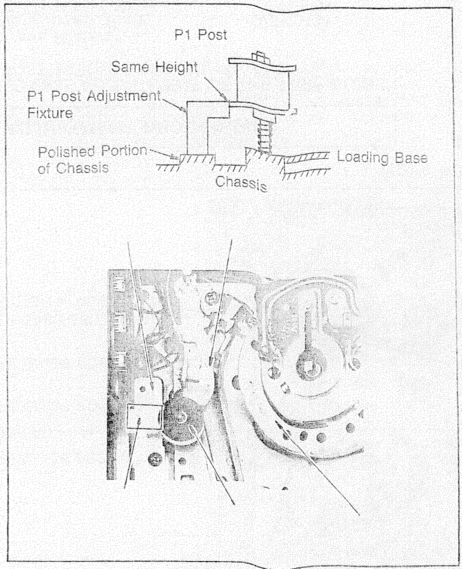


Figure 1

3. Confirm the lower edge of the P1 Post is as same height as upper edge of the P1 Post Height Adjustment Fixture. (Figure 1)
4. If the height is not same, adjsut the P1 Post Height by the Nut Driver.
5. Finally, play back the ending portion of NV-E240 cassette, and confirm that the tape runs between lower and upper edges of P1 Post by using the Check Light. If there is waving or frilling at the lower or upper edge of P1 Post, readjust the Height of P1 Post correctly. (Figure 2)

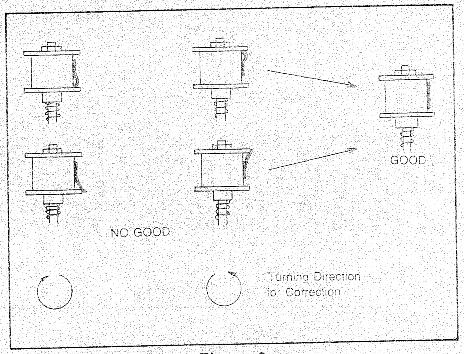


Figure 2

1-2. Adjustment and Confirm of the P4 Post Height

*Note:
1. Prevent any damage for the P4 Post, so set or remove the P4 Post Height Adjustment Fixture carefully.
2. Confirm that the P4 Post Height Adjustment Fixture on the Chasses perfectly, when adjusting P4 Post Height. Do not put the connector P6705 near the P4 Post between the P4 Post Height Adjustment Fixture and Chassis.

1. Set the P4 Post Height Adjustment Fixture as shown in Figure 3.

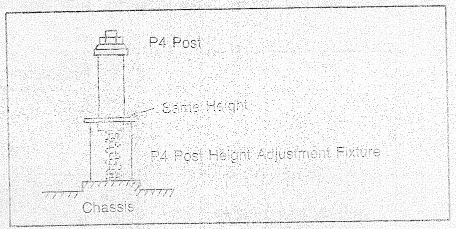


Figure 3

2. Confirm the lower edge of the P4 Post as same height as upper edge of the P4 Post Adjustment Fixture. (Figure 3)
3. If the height is not same, adjust the P4 Post height by the Nut Driver.
4. Play back the beginning portion of NV-E240 cassette, and confirm that the tape runs between lower and upper edges of P4 Post by using the Check Light.

If there is waving of frilling at the lower or upper edge of the tape, correct the tilt of A/C Head. After adjusting tilt of the A/C Head, the A/C Head Height Adjustment may be needed. (Figure 4)

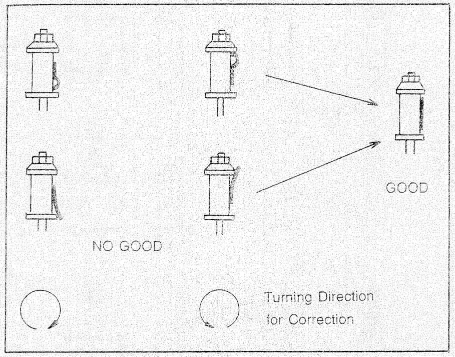


Figure 4

2. Adjustment and Confirmation of the Tape Guide Post Heights (P2, P3)

* Note:
This adjustment and confirmation should be performed after adjustment of the P1 and P4 Tape Guide Post Heights.

* Equipment Required:
Post Adjustment Screwdriver.............VFK0329
Check Light.............................VFK0343

1. Remove the Top Case.
2. When repeat the Loading and Unloading, confirm that the tape runs between lower and upper edges of the P2 and P3, Posts by using the Check Light. If there are waving or frilling at the lower or upper edge of the P2 and P3 Posts, readjust the heights of P2 and P3 Posts correctly. (Figure 5)

* Note:
Use the beginning and end portions of the NV-E240 cassette.

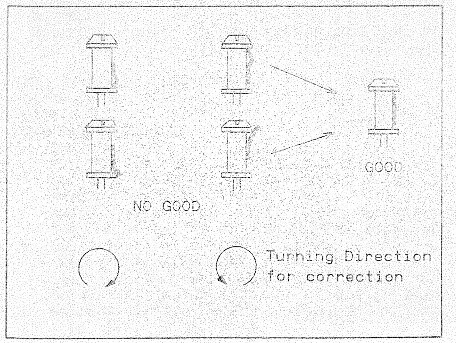


Figure 5

3. Confirm that the tape runs along the Cylinder Lead Correctly.
4. After adjusting the Tape Guide post Hights (P1, P2, P3, P4) adjustment of the Final Tape Interchangeability is required.
(Refer to the items 3-2-4, 3-2-5, 3-2-6, 3-2-7, 3-2-8 and 3-2-9)

3. Adjustment and Confirmation of the P5 tape Guide Post Height

* Note:
This procedure is the last item of the Tape Interchangeability so it should be porformed after adjustment other Tape Interchangeability items.

* Equipment Required:
Nut Driver (Purchase Locally)
Check Light.............................VFK0343

1. Remove the Top Panel and turn the power switch on. Insert the NV-E240 cassette.
2. Play back the beginning and end portions of the cassette by REV mode.
3. Confirm that the tape runs between lower and upper edges of the P5 Post by using the Check Light. If there is waving or frilling at the lower or upper edge of the P5 Post, correct the P5 Post Height.

3-2-4. CONFIRMATION OF THE A/C HEAD TILT

* Note:
This procedure should be performed after replacing the A/C head and pressure roller, and adjusting the height of the tape guide post (P4).
(Refer to "COARSE ADJUSTMENT OF THE TAPE GUIDE POST HEIGHTS".)

* Tools and Equipment Required:
Hex Wrench Set (0.9mm)..................VFK0326
Nut Driver (purchase locally)

1. Play back the beginning portion of NV-E240 blank cassette tape and confirm that the tape runs between lower and upper limiters of the P4 post. If there is waving or frilling in the lower edge or top edge of the tape, correct the tilt of the A/C head by turning the Hex screw located behind the A/C head. (Figure M18)

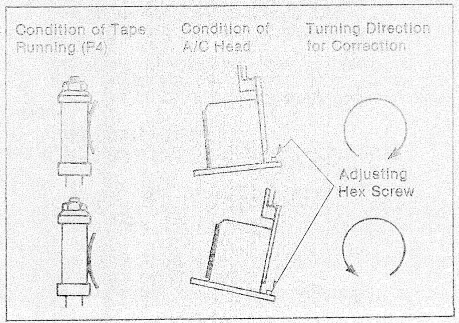

Condition of Tape Running (P4)
Condition of A/C Head
Turning Direction for Correction
Adjusting Hex Screw

Figure M18

2. If the tape curling cannont be acomplished by adjusting the A/C head tilt, then readjustment of the height of the tape guide post (P4) may be needed.

* Notes:

1. The tape guide post (P4) has been precisely adjusted at the factory. Therefore, normally the tape guide post (P4) readjustment is not required to eliminate the tape curling.
2. After adjusting the A/C head tilt, the A/C head height adjustment is required.

3-2-5. CONFIRMATION OF THE ENVELOPE OUTPUT (LINEARITY)

* Note:
Before playing back the alignment tape, play back a normal cassette tape and confirm correct transport.
(Refer to "CONFIRMATION OF THE TAPE TRANSPORT".)

* Tools and Equipment Required:
Post Adjustment Screwdriver.............VKF0329
Alignment Tape......................VFM8180HMDH

1. Connect the scope to TP5006 on the Video Head AMP. C.B.A. and TP5005 on the same C.B.A. to Ext-Trigger of the scope.
2. Play back the 2nd portion (Monoscope) of the alignment tape VFM8180HMDH.
3. Turn the Tracking Control VR and adjust for maximum Video RF envelope.
4. If the Video RF envelope appears like example "A" or "B" in Figure M19, then adjustment of the tape guide post (P2:Entrance) is necessary.
5. Adjust the tape guide post (P2) with the post adjustment screwdriver so that the Video RF envelope waveform at the entrance portion becomes flat as shown "C" in Figure M19. (See Figure M22 also)

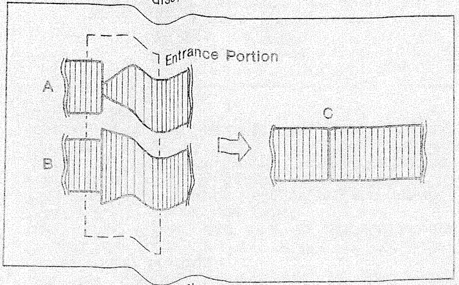


Figure M19

6. If the Video RF envelope appears like example "D" or "E" in Figure M17, then adjustment of the tape guide post (P3:Exit) is necessary.
7. Adjust the tape guide post (P3) in the same manner as the P2 post so that the exit portion becomes flat as shown in "F" in Figure M20.

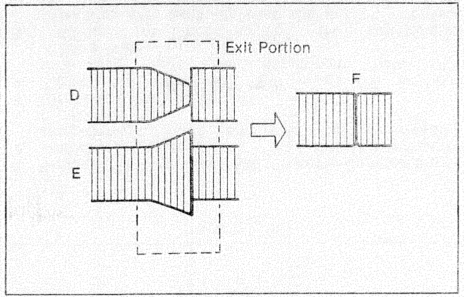


Figure M20

8. Turn the Tracking VR from end to end. The variation of Video RF envelope should be nearly parallel as shown in Figure M21.
9. Turn the Tracking VR and adjust for maximum Video RF envelope.
If the Video RF envelope does not meet these specs,
V1/V>0.7, V2/V>0.8,
then repeat steps 1-9 again. (Figure M23)

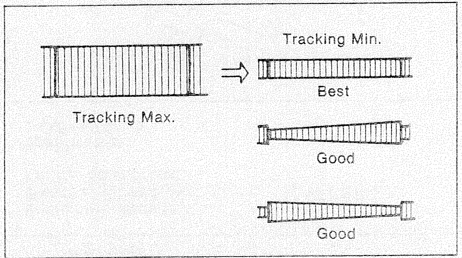


Figure M21

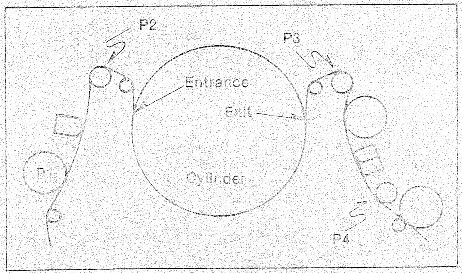


Figure M22 Loading of Posts

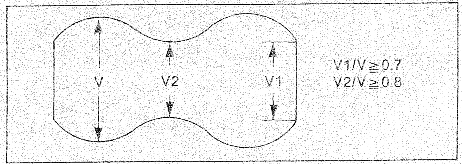


Figure M23 Spec. of Envelope Figure

10. Turn the Tracking VR from end to end again and then back to the detent (Fix) position.
At the detent position, the Video RF envelope waveform should be at maximum. If it is not at maximum then "ADJUSTMENT OF THE A/C HEAD HORIZONTAL POSITION". is necessary.

(Refer to "FINE ADJUSTMENT OF THE A/C HEAD HORIZONTAL POSITION".)

3-2-6. COARSE ADJUSTMENT OF THE A/C HEAD HEIGHT

* Note:
This procedure should be performed only when the A/C Head is replaced.

* Tools and Equipment Required:
Check Light..............................VFK0343
Nut Driver (Purchase locally)

With the tape running, look at the lower edge of the control head by using the check light and check if the lower edge of tape runs along the lower edge of the control head.
If it doesn't slightly turn the nut (A) behind the A/C Head (Figure M24) to either lower or raise the A/C head so that the tape runs along the lower edge of the control head.
Turn the nut (A) clockwise to lower the head, and counterclockwise to raise it. (Figure M24)

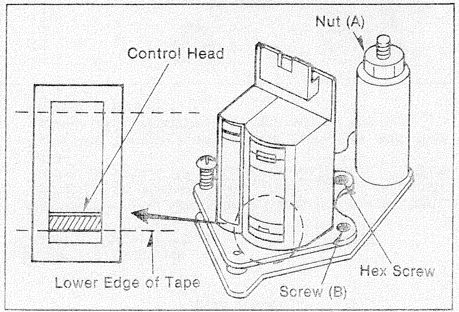


Figure M24

3-2-7. ADJUSTMENT OF THE A/C HEAD HEIGHT AND AZIMUTH

* Note:
This procedure should be performed only when the A/C Head is replaced and posts hight are readjusted.

* Tools and Equipment Required:
Nut Driver (Purchase locally)
Alignment Tape......................VFM8180HMDH

1. Connect the scope CH1 to the HD/NOR Audio Output CH1 and the scope CH2 to the HD/NOR Audio Output CH2 on the rear panel.
2. Play back the 2nd portion (Normal Audio 6kHz) of the alignment tape, VFM8180HMDH.
3. Adjust the screw (B) so that the CH2 output level becomes maximum. (Figure M25)

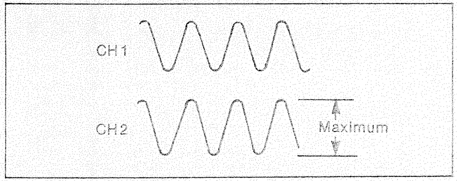


Figure M25

4. Then adjsut the nut (A) so that the CH2 envelope becomes maximum.
5. Readjust the screw (B) so that the phases of the both channel are matched as shown below. (Figure M26)

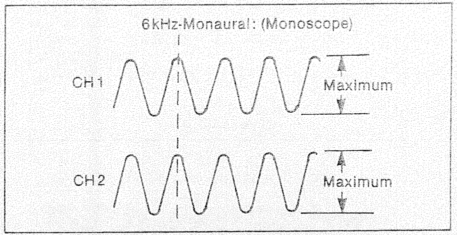


Figure M26 Adjustment of A/C Head Height and Azimuth-(3)

3-2-8. COARSE ADJUSTMENT OF THE A/C HEAD HORIZONTAL POSITION

* Note:
This procedure should be performed only when the A/C head is replaced, and after performing the tape interchangeability adjustment.

* Tools and Equipment Required:
H.Position Adj. Fixture..................VFK0328
Alignment Tape.......................VFM8180HMDH

1. Set the tracking Control VR to the center detent (fixed) position.
2. Connect the scope CH1 to TP5006 on the Video Head Amp. C.B.A., and CH2 to HD/NOR Audio Output (CH1) on the rear panel.
3. Play back 1st position (Monoscope and Normal Audio 3kHz) of the Alignment tape VFM8180HMDH.
4. Adjust A/C head horizontal position screw so that the phase of Audio drop out and RF envelope drop out becomes the same. (Figures M27 and M28)

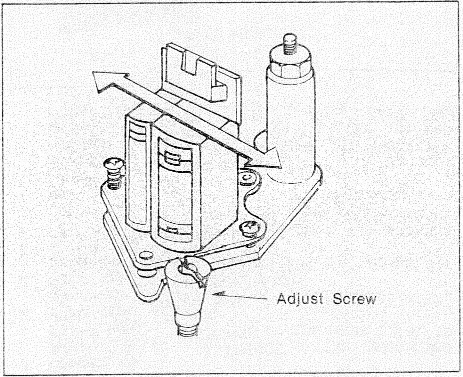


Figure M27

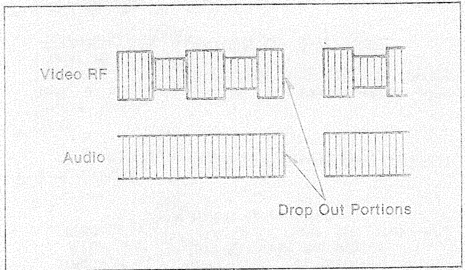


Figure M28

3-2-9. FINE ADJUSTMENT OF THE A/C HEAD HORIZONTAL POSITION (X-VALUE)

* Note:
When the A/C head is replaced, the coarse adjustment of the A/C head horizontal position is required before performing this fine adjustment.

* Tools and Equipment Required:
H.Position Adj. Driver..................VFK0328
Alignment Tape.......................VFM8180HMDH

1. Set the Tracking Control VR to the center detent (fixed) position.
2. Connect the scope CH1 to TP5006 on the Video Head Amp C.B.A., and TP5005 on the same C.B.A. to Ext-trigger the scope.
3. Play back 2nd position (Monoscope) of the Alignment tape, VFM8180HMDH.
4. **Adjust the adjust screw so that the RF envelope output level becomes maximum at the detent** position. (Figure M27)
5. Turn the Tracking VR from end to end and then back to the detent position.
   Confirm that the FM envelope output level is maximized at the detent position. (Figure M21)

4. OTHER MECHANICAL ADJUSTMENT PROCEDURES

4-1. ADJUSTMENT OF THE SUB-LOADING ARM UNIT

* Equipment Required:
Eccentric Screwdriver...................VFK0135
Philips Screwdriver

* Specification:
t=0.5+-0.2mm

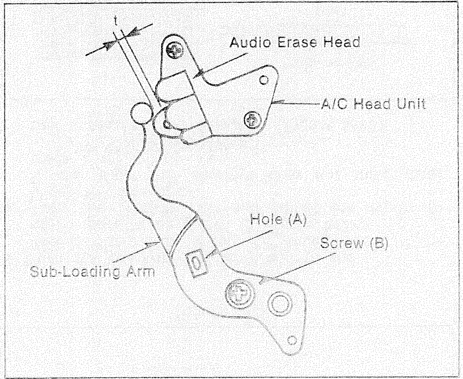


Figure M29

1. Remove the Top Cover and Cassette Compartment.
2. Insert a cassette to the removed cassette compartment. This simulates the sub-loading completion mode.
3. Turn the power switch off.
4. Loosen the screw (B), and insert the eccentric screwdriver into the adjustment hole (A). (Figure M29)
5. Adjust the position of the sub-loading threading arm unit so that the gap "t" between the Sub-Loading arm and the AE head is 0.5mm +- 0.2mm. (Figure M29)

4-2. ADJUSTMENT OF THE SAFETY SWITCH

* Specification:
The switch should close when a cassette with an erase tab is inserted, and should open when a cassette without an erase tab is inserted.

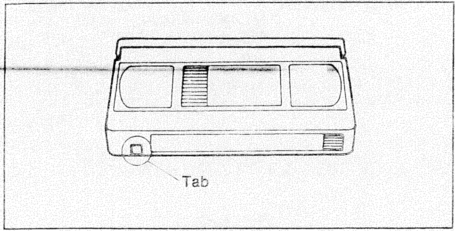


Figure M30

* Equipment Required:
Cassette Holder Fixture..................VFK188

1. Remove the Top Cover, and Cassette Compartment.
2. Place the fixture over reel tables. Slightly loosen 3 screws (A) by about half turn. (Figure M31)
3. Turn the switch base counter clockwise and then slowly turn clockwise until the switch turn on.
4. Tighten 3 screws.

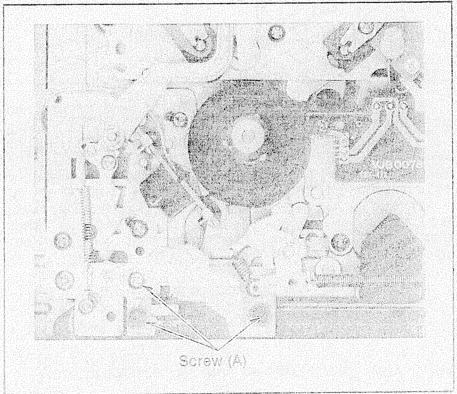
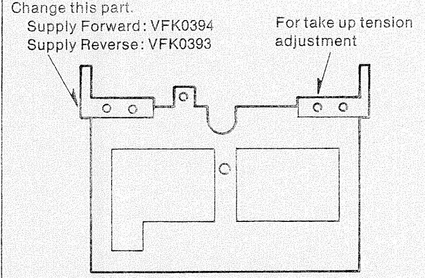


Figure M31

4-3. TENSION POSTS POSITION ADJUSTMENT

* Equipment Required:
Tension Post Adjustment Plate..................................VFK0236
FWD Sensor Adj. Fixture..................VFK0394
REV Sensor Adj. Fixture..................VFK0393
Fine Adj. Screwdriver...................VFK0330
Vacuum Tube Volt Meter (VTVM) or Digital Volt Meter

Note:
Fix the FWD sensor adjustment fixture (VFK0394) on the tension post adjustment plate (VFK0236) when measuring the supply forward tension. Use the REV sensor adjustment fixture (VFK0393) when measuring the supply reverse tension.



This jig is Tension Post Adj. Plate (VFK0236).

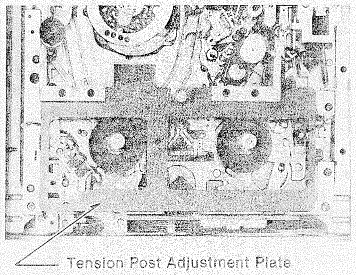


Figure M32

1. Remove the Top cover and the Cassette Compartment.
2. Insert a cassette to the removed cassette compartment.
3. Install the Tension Post Adjustment Plate after the sub-loading complete. Then, push the play button.

4-3-1. FWD TENSION POST POSITION ADJUSTMENT

1. Place the Tension Post Position Adjustment plate (VFK0236) with Forward Tension Jig (VFK0394) over the reel tables. (Figure M32) Then, push the play button. (Figure M32)
2. Connect the DVM to Pin 2 of connector P2701 on the Reel Servo C.B.A.
3. Loosen the screw (A).
4. Insert the fine adjustment screwdriver into the adjustment hole (B) next to the screw (A) and adjust the Tension Arm Unit to 2.0V~2.5V. (Figure M33)
5. Tighten the screw (A). (Figure M33)

4-3-2. REV TENSION POST POSITION CONFIRMATION AND ADJUSTMENT

1. Place the Tension Post Position Adjustment plate (VFK0236) with the Reverse Tension Jig (VFK0393) over the reel tables. Then, push the play button.
2. Connect the DVM to Pin 4 of connector P2701 on the Reel Servo C.B.A.
3. Loosen the screw (C). (Figure M33)

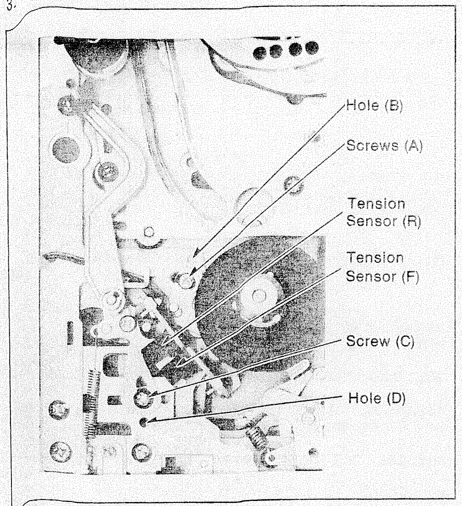


Figure M33

4. Insert the fine adjustment screwdriver into the adjustment hold (D) next to the screw (C) and adjust the Tension Arm Unit to 2.0~2.5V. (Figure M33)
5. Tighten the screw (C). (Figure M33)

4-3-3. TAKE-UP TENSION POST POSITION CONFIRMATION AND ADJUSTMENT

1. Place the tension post adjustment plate (VFK0236) over the reel tables. (Figure M32) Then, push the play button.
2. Connect the DVM to Pin 2 of Connector P2700 on the Reel Servo C.B.A.
3. Loosen the screw (A). (Figure M34)
4. Insert the fine adjustment scrwedriver into the adjustment hold (B) next to the screw and adjust it so that the voltmeter indicates 2~2.5V. (Figure M34)
5. Rotate the Tension Arm counter clockwise by hand.
The DVM should indicate 0~0.5V.
Next, rotate the Tension Arm clockwise. The DVM should now indicate 4.5V+-0.5V.
6. Rotate the tension arm clockwise by hand. The DVM should indicate 0~0.5V.
Next, rotate the Tension Arm counter-clockwise. The DVM should now indicate 4.5V+-0.5V.

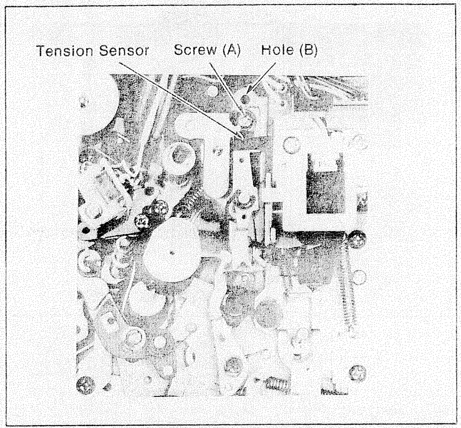


Figure M34

4-4. SUPPLY & TAKE-UP BRAKE SOLENOID ADJUSTMENT

* Equipment Required:
Eccentric Screwdriver...................VFK0135

1. Remove the Top Case and Cassette Compartment.
2. Loosen the 4 screws (B) and insert the eccentric screwdriver into the hole (C). (Figure M35)

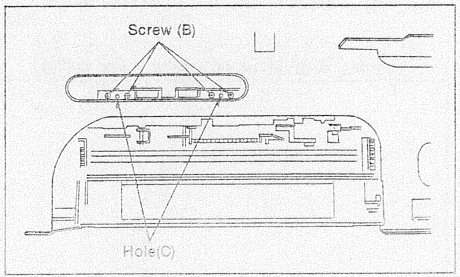


Figure M35

3. Adjust the position of the Brake Solenoid so that the gap "t1" and "t2" between Supply & Take-up Table and Supply & Take-up brake is 0.5mm+-0.2mm. (Figure M36)

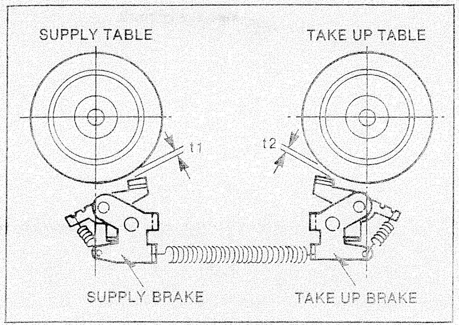


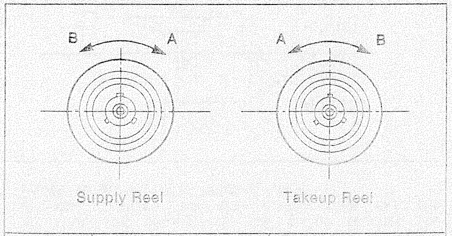
Figure M36

4-5. CONFIRMATION/ADJUSTMENT OF THE BRAKE TORQUE

Confirmation Procedure

* Equipment Required:
Torque Gauge............................VFK0133
Adaptor for Gauge.......................VFK0134

1. Remove the top cover and the cassette compartment.
2. Attach the adaptor to the torque gauge and place the deck in STOP mode.(Figure M38)
3. Place the torque gauge on the reel table. The weight of the gauge should not rest on the reel table.
4. Turn the torque gauge in the direction indicated in Figure M37 until the brake begins slipping and read the gauge.



	A	B
Takeup	450~800g~cm	250~500g-cm
Supply		

Figure M37 Brake Torque Spec.

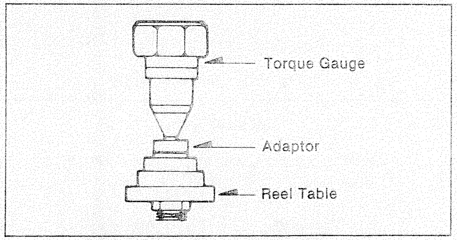


Figure M38 Measuring Method

Adjustment Procedure

To adjust the brake torque, move the spring to a different notch on the brake arm. Increase the brake torque by moving the spring to an outer notch and decrease the brake torque by moving the spring to an inner notch. (Figure M39)

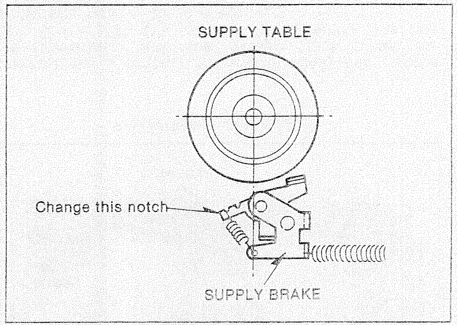


Figure M39 Adj. of Brake Torque

Note:
If the proper brake torque cannot be obtained by changing the position of the spring, clean the braking surface of the reel table with a soft cloth and remeasure the brake torque. If it is still out of specification, replace the Brake Arm Unit.

4-6. CONFIRMATION OF THE F.F. TORQUE

* Equipment Required:
Dial Torque Gauge.......................VFK0133
Adaptor for Gauge.......................VFK0134

* Specifications:
Back Tension Torque...................3~15g–cm
Take–up Torque........................more than 350g~cm

1. Remove the top cover and the cassette compartment.
2. Attach the adaptor to the torque gauge, and blind the take–up and supply photo transistors with pieces of black tape. Lower the cassette compartment and turn the power switch on.

3. Set the torque gauge on the supply reel table. Push the F.F. button and measure the back tension torque.

Note:
While measuring, the weight of the gauge should not rest on the reel table.

4. Set the torque gauge on the take-up reel table. Push the FF button then use your hand to stop the supply reel table from rotating. Measure the take-up torque.

Note:
There are no adjustments in this procedure. If the torque readings are off considerably, the rollers, idlers or reel tables may need replacement.

4-7. CONFIRMATION OF THE REW TORQUE

* Equipment Required:
Diakl Torque Gauge........................VFK0133
Adaptor for Gauge........................VFK0134

* Specifications:
Back Tension Torque.....................5~15g−cm
Take-up Torque.........................more than 350g~cms

1. Remove the top panel and the cassette compartment.
2. Attach the adaptor to the Dial Torque Gauge and blind the take-up and supply photo transistors with pieces of black tape.
Lower the cassette compartment and turn the power switch on.
3. Set the gauge on the take-up reel table. Push the REW button and measure the back tension torque.

Note:
While measuring the weight of the gauge should not rest on the reel table.

4. Set the gauge on the supply reel table. Push the REW button, then use your hand to STOP the take-up reel table from rotating. Measure the take-up torque of the supply reel table.

4-8. MEASUREMENT AND ADJUSTMENT OF THE BACK TENSION

A. Measurement Procedure

* Equipment required:
Back Tension Meter (Tentelometer)........VFK0132
VHS Cassette Tape (240−minute tape)

* Specifications...........................25+−2g

1. Remove the top cover and the cassette compartment.
2. Pull the erase head in the direction indicated by the arrow in Figure M40 secure it with a piece of adhesive tape.
3. Play back the cassette tape from the beginning and wait until the tape movement has stabilized. (for approx. 10 to 20 seconds)
4. Insert tension meter over the tape and take a reading.

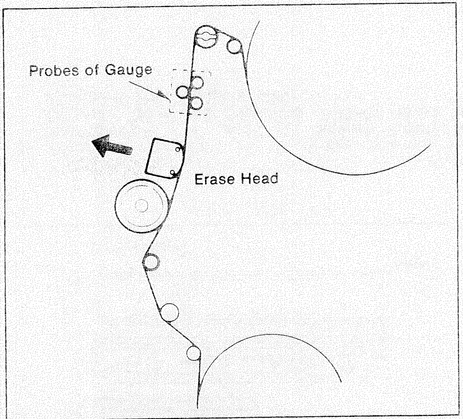


Figure M40 Measurement of Back Tension

Note:
1. While measuring, make sure that the three probes of the meter are all in good contact with the tape, but out of contact with the supply inertia roller.
2. As the tension meter is very sensitive, we recommended taking 3 separate readings.

B. Adjustment Procedure

* Equipment Required:
Fine Adjustment Screwdriver............(VFK0330)

1. Remove the top cover and the cassette compartment.
2. Loosen the screw (A) and insert the fine adjustment screwdriver into the hole (B). (Figure M41)
3. Move the adjustment plate in either of the directions indicated by the arrow in Figure M41 to obtain the specified tension. Turn the driver clockwise to decrease the tension, counter-clockwise to increase it.
4. Tighten the screw (A) and remeasure the tension with the meter to confirm it.

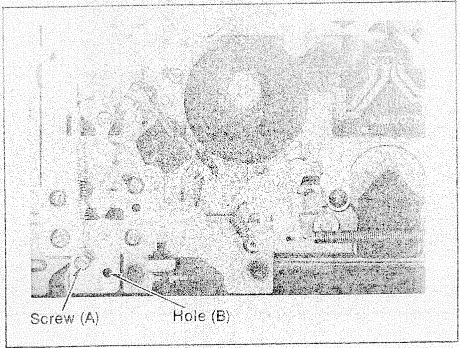


Figure M41

4-9. ADJUSTMENT OF THE REEL TABLES HEIGHTS

* Equipment required:
Post Adjustment Plate....................VFK0191
Reel Table Height Fixture................VFK0190

* Specification:
0mm+−0.1mm

1. Remove the Cassette Compartment.
2. Place the Post Adjustment Plate over the reel tables.
3. Place the Reel Table Height Gauge on the plate so that the scraper on the gauge touches the cut-out portion of the plate, then set the gauge to zero ("0"). (Figure M42)

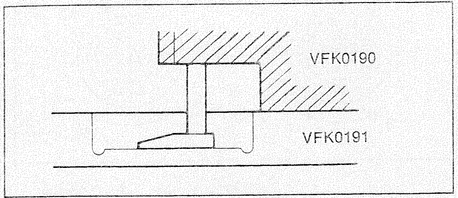


Figure M42

4. Measure the height of the top surface of either reel table and note the difference in height from the plate cut-out. (Figure M42 and M43) Repeat this procedures for the other reel table.

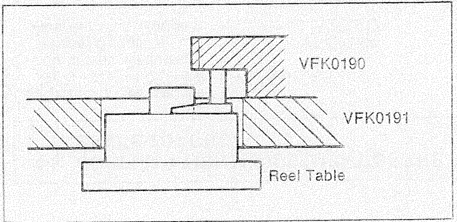


Figure M43

5. If the difference is more than 0.1mm higher or lower, replace the poly slider washer located under the reel table with one of the appropriate thickness. Poly slider washers are avilable in thickness of 0.13mm, 0.25mm and 0.5mm.

4-10. ADJUSTMENT OF CAM GEAR

General Description:
The mechanism of this model is primarly engaged to the electrical System Control Circuit through the mode select switch. Therefore, the relation of the mode switch and the cam gear decides all further mechanical movement of the mechanical parts such as levers, gears, rollers and so on.
If the cam gear and the mode select switch are improperly adjusted, the deck will either unload the tape or stop automatically, and may result in damage to certain mechanical or electrical parts.

4-10-1. PRELIMINARY ADJUSTMENT PROCEDURE

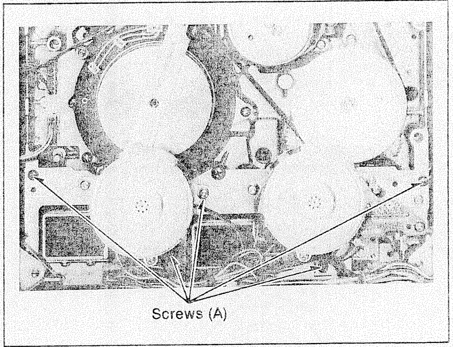


Figure M44 Sub-Chassis

Unscrew the 5 screws (A) (Figure M44) and remove the sub-chassis with Reel motors, fast, loosen the Hex Screws (B) (Figure M45) and remove the reel tables and remove the connectors.

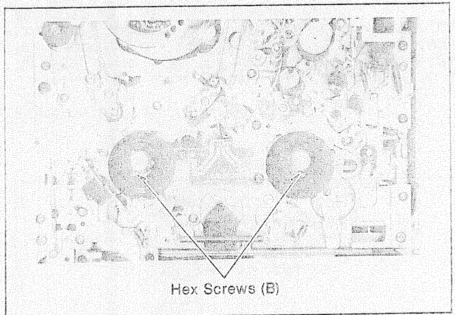


Figure M45 Reel Table

To remove the large pulley, unscrew the 1 screw (C) (Figure M46) and remove the 2 retaining rings (D), and remove the large pulley.

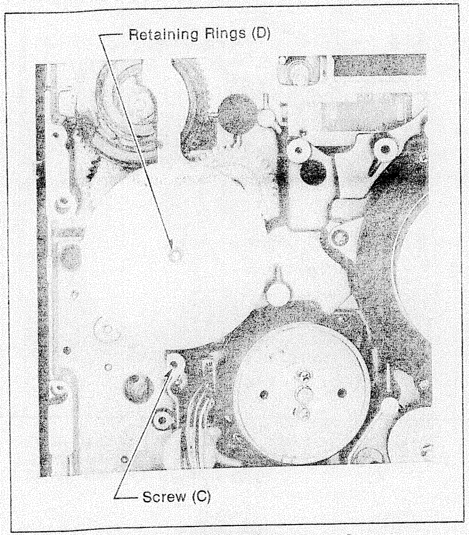

Retaining Rings (D)
Screw (C)

Figure M46 Large Pully Belt Cover

To remove the sector gear, unscrew the 1 nut (E) (Figure M47) and remove the holder, then remove the 1 retaining ring (F) and remove the sector gear.

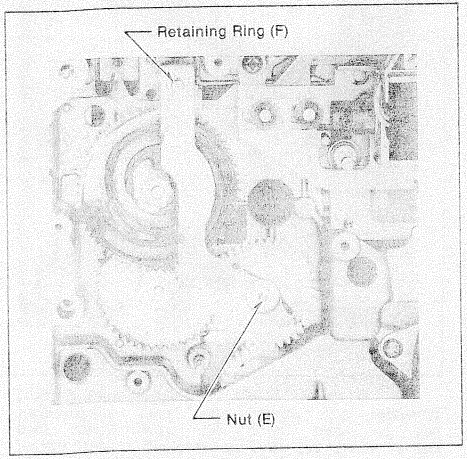

Retaining Ring (F)
Nut (E)

Figure M47 Select Gear

4-10-2. ADJUSTMENT PROCEDURE

1. Turn the Loading Gear clockwise until posts P2 and P3 are unloaded position. (Figure M48)

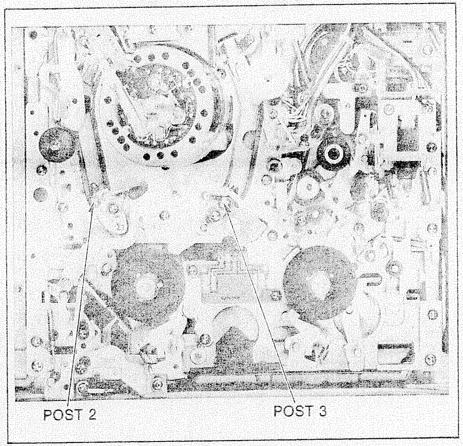

POST 2
POST 3

Figure M48 Unloading Position

2. install the action gear so that the hole in the action gear meets the projection on the loading gear. Be sure that the loading gear is still in the fully unloaded condition. (Figure M49)

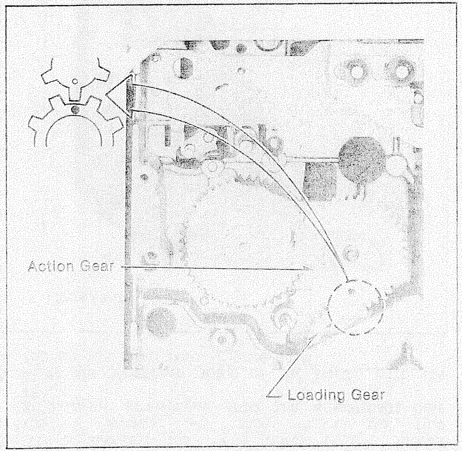

Action Gear
Loading Gear

Figure M49

3. Slowly slide the main rod so that the holes meet together. (Figure M50)

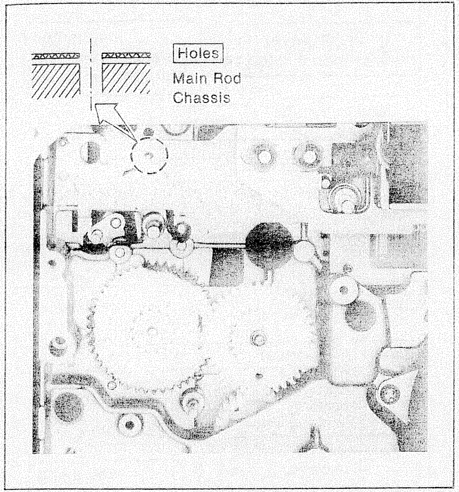

Holes
Main Rod
Chassis

Figure M50

4. Insert the cam gear so that the hole (A) on the gear meets the hole in the main rod. To make alignment easier, use a small hex wrench (VFK75) or metal pin. Check to see that the two V-shaped marks are still aligned. (Figure M51)

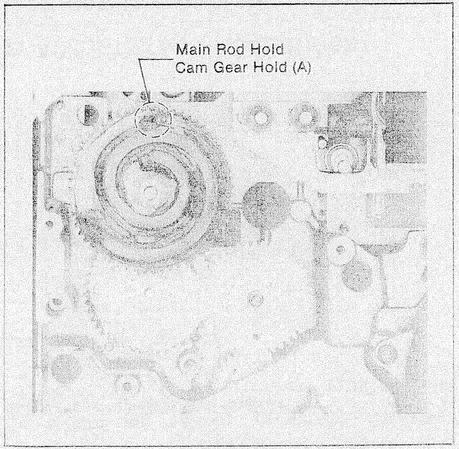

Main Rod Hold
Cam Gear Hold (A)

Figure M51

5. Install the sector gear so that the pin on the sector gear meets the inner slot of the cam gear (simple slot side). Install the 2 retaining rings on the cam and sector gears. (Figure M52)

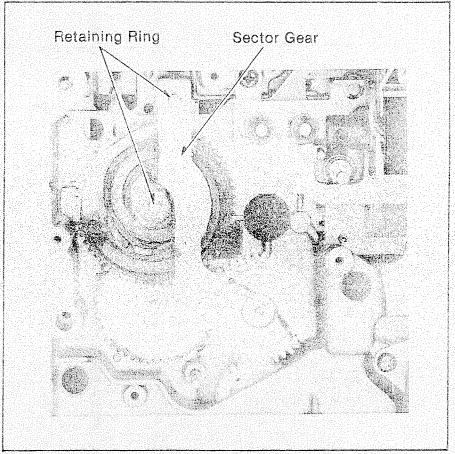

Retaining Ring
Sector Gear

Figure M52

6. The gear configuration should now be as shown in Figure M53.

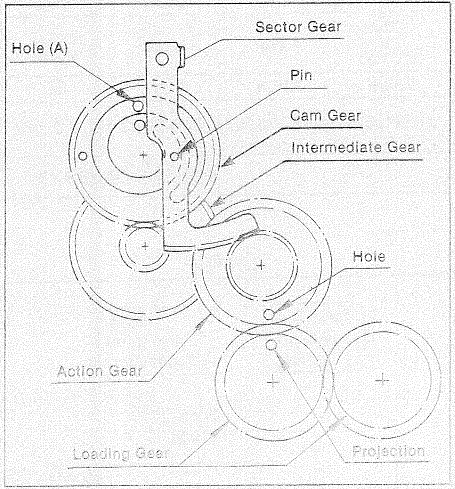

Sector Gear
Hole (A)
Pin
Cam Gear
Intermediate Gear
Hole
Action Gear
Loading Gear
Projection

Figure M53

7. Install the gear protector and tighten the mounting nut.
   Install the large gear so that the teeth of the gear mesh with the outer teeth of the intermediate gear, and install the retaining ring. (Figure M54)

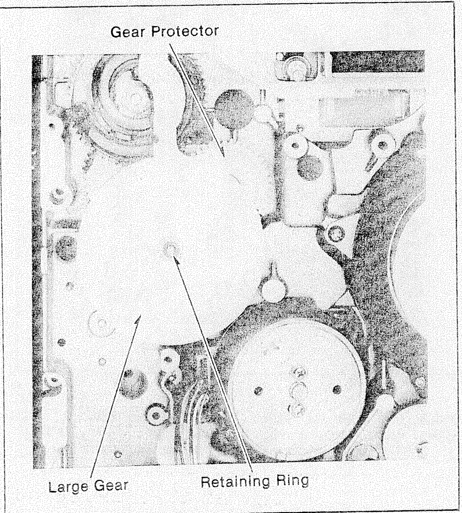

Gear Protector
Large Gear
Retaining Ring

Figure M54

8. Install the belt. (Figure M55)
   Turn the large pulley in both directions and confirm that the mechanism operates smoothly.

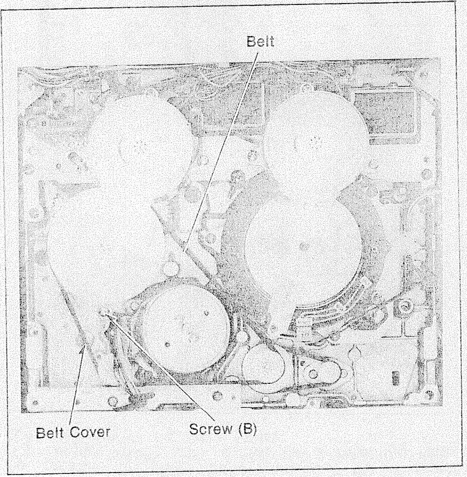

Belt
Belt Cover
Screw (B)

Figure M55

4-11. ADJUSTMENT OF THE MODE SELECT SWITCH

1. Set the main rod in the unloading completion condition.
2. To adjustment the mode select switch, loosen the 2 screws (A) then insert the fine adjustment screwdriver into the adjustment hole (B).
3. Align the V-shaped notch of the switch with the tab on the main rod. (Figure M56)

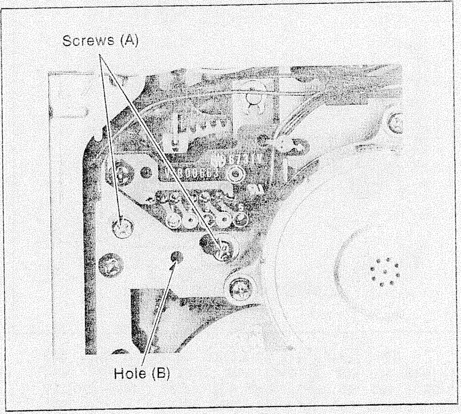

Screws (A)
Hole (B)

Figure M56

ELECTRICAL ADJUSTMENT PROCEDURES

This section provides complete electrical adjustment procedures which may be required for electronic circuits of VHS Video Cassette recorders.

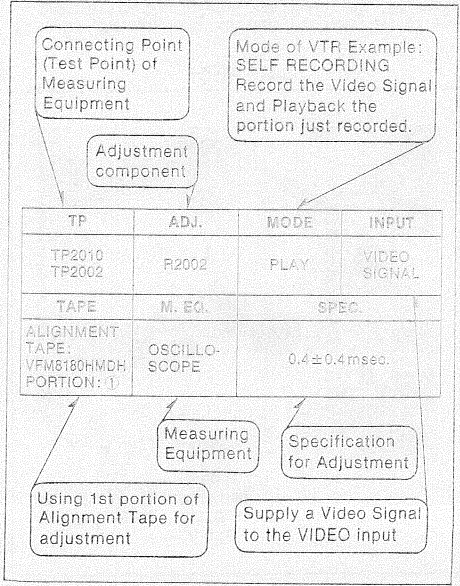
1. TEST AND SERVICE EQUIPMENT

To perform the electrical adjustments completely, following equipments are required.

1. VTVM (Vacuum Tube Volt Meter) or DVM (Digital Volt Meter)
   Voltage Range: 0.001~50V
2. Dual-Trace Oscilloscope
   Voltage Range: 0.005~50V/div.
   Frequency Range: DC~100MHz
   Probes: 10:1 or 1:1
3. Frequency Counter
   Frequency Range: 0~10MHz
4. Signal Generator (Sinewave)
   Frequency Range: 0~10MHz
5. Video Sweep Generator
   Frequency Range: 0~10MHz
6. Colour Monitor TV
7. Plastic Tip Driver
8. Spectrum Analyzer
9. Video Signal Generator
10. VHS Alignment Tape (VFM8180HMDH)

2. ADJUSTMENT PROCEDURES

2-1. HOW TO READ THE ADJUSTMENT PROCEDURES


Connecting Point (Test Point) of Measuring Equipment
Mode of VTR Example: SELF RECORDING Record the Video Signal and Playback the portion just recorded.
Adjustment component
Using 1st portion of Alignment Tape for adjustment
Measuring Equipment
Specification for Adjustment
Supply a Video Signal to the VIDEO input

TP	ADJ.	MODE	INPUT
TP2010 TP2002	R2002	PLAY	VIDEO SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
ALIGNMENT TAPE: VFM8180HMDH PORTION: ①	OSCILLO-SCOPE	0.4±0.4msec.	

Figure E1

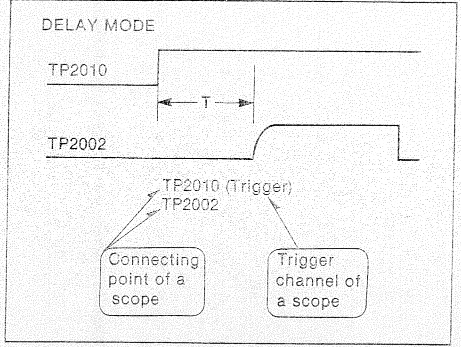

DELAY MODE
TP2010
T
TP2002
TP2010 (Trigger)
TP2002
Connecting point of a scope
Trigger channel of a scope

Figure E2

2-2. SERVO SECTION

2-2-1. CYLINDER SERVO REF. PULSE ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3001 TP2003	VR2002	PLAY	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
VFM8180HMDH PORTION: ②	OSCILLO-SCOPE	T=V. SYNC PORTION ±0.25H	

1. Set the switches to the following position.
   *INPUT Select Switch-LINE position
   *SYNC Select Switch-NORM position
   *FRAME SERVO Switch-OFF position

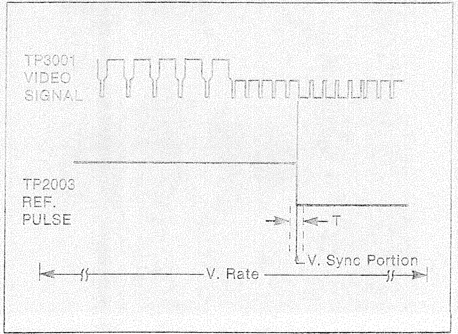

TP3001 VIDEO SIGNAL
TP2003 REF. PULSE
T
V. Rate
V. Sync Portion

Figure E3

2-2-2. CYLINDER FREE RUN ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP2005	VR2012	PLAY	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
VFM8180HMDH PORTION: ②	OSCILLO-SCOPE	A/B=0.9~1.1	

1. Set the switches to the following position.
   *SYNC Select Switch–NORM position
   *FRAME SERVO Switch–OFF position
2. Place the DECK in the PLAY mode.
3. Connect the scope to TP2005.
4. Adjust VR2012 so that the "A" and "B" portions become A/B=0.9~1.1.

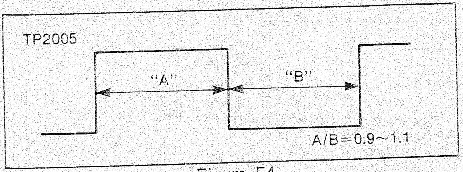


Figure E4

2-2-3. PG SHIFTER ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3009 TP2002	VR2007 (PG2) VR2008 (PG1)	PLAY	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
VFM8180HMDH PORTION: ②	OSCILLO-SCOPE	T1=6.5H±0.25H T2=LESS THAN 10µsec.	

* Note:
This adjustment should be performed only after completion of the tape interchangeability adjustment.

1. Set the switches to the following position.
   * SYNC Select Switch–NORM position
   * FRAME SERVO Switch–OFF position
2. Set the triggering slope of scope to "–" side, and expand the V sync portion of the signal.
3. Adjust VR2008 (PG1) so that the falling edge of switching pulse becomes 6.5H +– 0.25H before the V sync portion. (Figure E5)

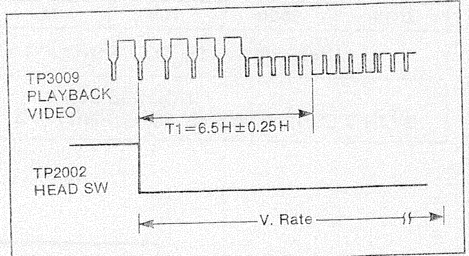


Figure E5

4. Change the triggering slope of the scope from "–" to "+" side, and adjust VR2007 (PG2) so that the difference between the rising and falling edges becomes less than 10usec. (Figure E6)

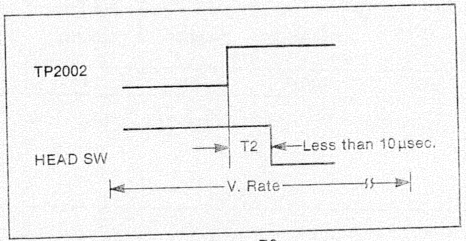


Figure E6

2-2-4. TRACKING FIX ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP2001 TP2002	VR2001	PLAY	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
VFM8180HMDH PORTION: ②	OSCILLO-SCOPE	T=0.4msec.±0.1msec.	

1. Set the switches to the following position.
   * SYNC Select Switch–NORM position
   * FRAME SERVO Switch–OFF position
2. Adjust the Tracking VR on the Front Panel to the centre fix position.

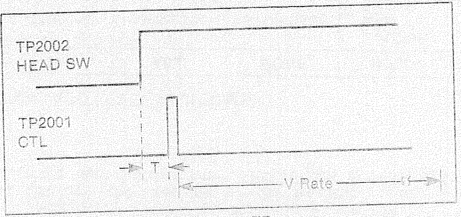


Figure E7

2-2-5. SS HEAD SWITCH ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3009 TP2010	VR2011	PLAY (FWD ×2)	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
VFM8180HMDH PORTION: ②	OSCILLO-SCOPE	T=V. SYNC PORTION ±0.25H	

* Note:
This adjustment should be performed only after adjusting the PG shifter adjustment.

1. Set the SYNC Select Switch to NORM position.
2. Press the SEARCH key and set the SEARCH DIAL for FWD X2 position.

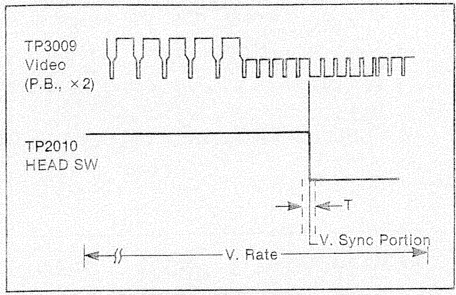


Figure E8

2-3. SYSTEM CONTROL SECTION

2-3-1. HD AUDIO HEAD SWITCH SHIFTER ADJUSTMENT

* Note:
This adjustment should be performed only after adjusting the PG shifter adjustment.

TP	ADJ.	MODE	INPUT
TP6005	VR6004	PLAY	
TAPE	**M. EQ.**	**SPEC.**	
VFM8180HMDH PORTION: ②	OSCILLO-SCOPE	T=13.33±0.03msec.	

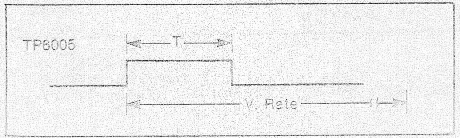


Figure E9

2-3-2. FLYING ERASE HEAD CURRENT ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP (HOT) GND (GND) (Measuring Circuit)	VR6001 (Ⓐ) VR6002 (Ⓑ)	INSERT VIDEO	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
ORDINALY SP RECORDED TAPE	OSCILLO-SCOPE (More than 50MHz)	120±10mV (for 100MHz Oscilloscope) or 110±10mV (for 50MHz Oscilloscope)	

* Note:
To make this adjustment, please use the following circuit. (Figure E10)

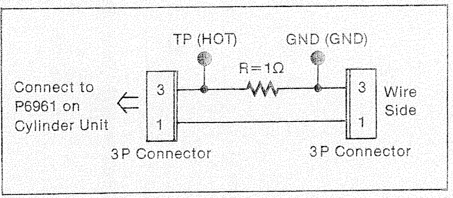
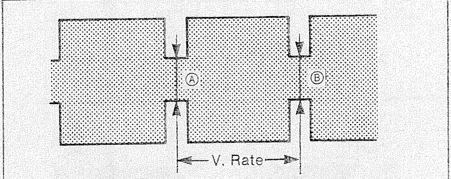


Figure E10

1. Connect the above Measuring Circuit (1) between connector P6961 on the Cylinder Unit.
2. Connect the scope to TP (HOT) on the Measuring Circuit (1) and GND on the Measuring Circuit (1).
3. Play back the ordinary SP recorded tape, and press the EDIT VIDEO key.
4. Press the EDIT START key.



Ⓐ=Ⓑ=120±10mV (When 100MHz Oscilloscope is used)
or
Ⓐ=Ⓑ=110±10mV (When 50MHz Oscilloscope is used)

Figure E11

2-3-3. FLYING ERASE HEAD SWITCH SHIFTER ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP6004	VR6003	PLAY	
TAPE	**M. EQ.**	**SPEC.**	
VFM8180HMDH PORTION: 2	OSCILLO-SCOPE	$T=6.66^{+0}_{-0.05}$ msec.	

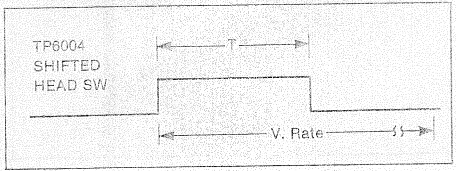


Figure E12

2-4. LUMINANCE, CHROMINANCE & HEAD AMP SECTION

2-4-1. 4.43MHz X'TAL OSC ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP8009	C8070	STOP (E-E)	
TAPE	**M. EQ.**	**SPEC.**	
	FREQUENCY COUNTER	4.433619MHz±10Hz	

2-4-2. REC VCO ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP8004	VR8001	STOP (E-E)	
TAPE	**M. EQ.**	**SPEC.**	
	FREQUENCY COUNTER	5.05±0.05MHz	

* Note:
To make this adjustment, please prepare the following circuit. (Figure E13)

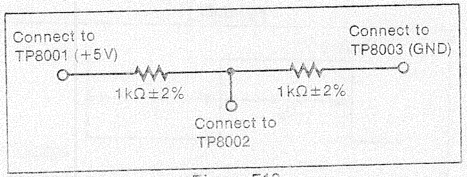


Figure E13

1. Connect the Measuring Circuit (2) to TP8001, TP8002 and TP8003 as shown in Figure E13.
2. Confirm that reading of the frequency count is more than 3.9MHz when TP8003 (GND) is removed.

2-4-3. PB VCO ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP8008	VR8002	STOP (E-E)	
TAPE	**M. EQ.**	**SPEC.**	
	FREQUENCY COUNTER	5.05±0.05MHz	

* Note:
To make this adjustment, please prepare the following circuit. (Figure E14)

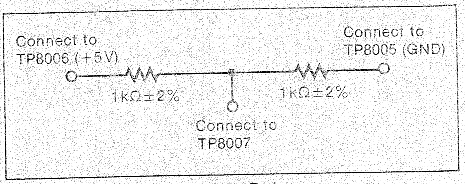


Figure E14

1. Connect the Measuring Circuit (3) to TP8005, TP8006 and TP8007 as shown in Figure E14.
2. Confirm that reading of the frequency count is more than 3.9MHz when TP8005 (GND) is removed.

2-4-4. AGC LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3001	VR3001	STOP (E-E)	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK	OSCILLO-SCOPE	0.7±0.02V	

1. Set the VIDEO LEVEL Switch to AGC position.

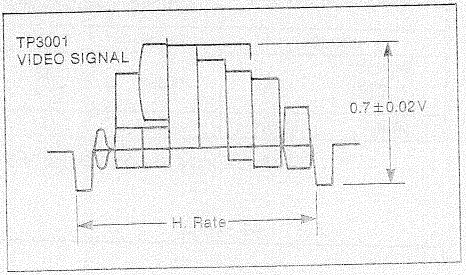


Figure E15

2-4-5. DETAIL ENHANCER LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3003	VR3006	STOP (E-E)	VIDEO SWEEP
TAPE	**M. EQ.**	**SPEC.**	
BLANK	VIDEO SWEEP/ OSCILLO-SCOPE	A : B=1 : 1.4±0.1(+3dB)	

1. Set the INPUT Select Switch to LINE position and VIDEO LEVEL Switch to AGC position.
2. Set the sweep generator output as shown in Figure E16 and supply to the Video Input.

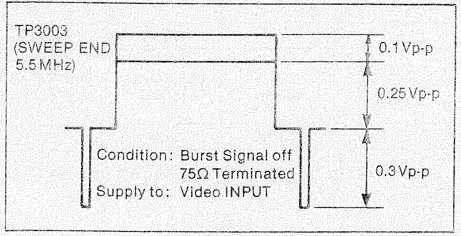


Figure E16

3. Adjust VR3006 so that 0.1MHz and peak level portions become A(1) : B(1.4 + − 0.1) as shown in figure E17.

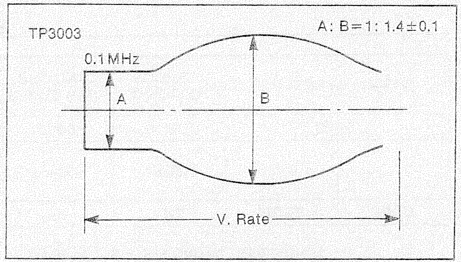


Figure E17

2-4-6. SYNC TIP & DEVIATION ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3004	VR3003 VR3005	STOP (E-E)	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK	OSCILLO-SCOPE	SEE FIGURE E18, E19	

Note:
Before this adjustment "AGC Level Adjustment" should be completed.

1. Set the VEDEO LEVEL Switch to AGC position.
2. Supply a colour bar signal to the VIDEO INPUT on the rear panel.
3. Connect a scope to Pin 8 of IC3005 with an 1 : 1 probe.
4. Turn the resistor VR3002 fully clockwise and resistor VR3004 fully counterclockwise.
5. Supply a 3.8 MHz sinewave signal at −40dB (0.028vp−p) to TP3004 through a 0.01uF capacitor. Set the frequency precisely with a frequency counter.
6. Adjust SYNC VR3005 so that the beat on the sync tip portion of the signal becomes minimum as shown in Figure E18.
7. Next, supply a 4.8 MHz sinewave signal at −40dB (0.028Vp−p) to TP3004 through a 0.01uF capacitor. Set the frequency precisely with a frequency counter.

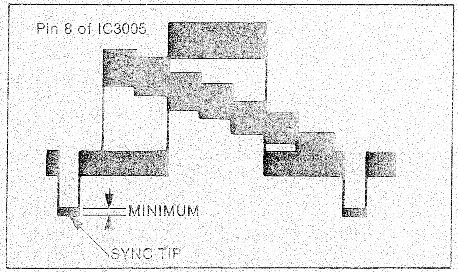


Figure E18

8. Adjust DEV VR3003 so that the beat on the white peak portion of the signal becomes minimun as shown in Figure E19.

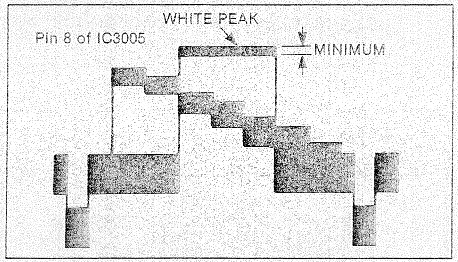


Figure E19

2-4-7. WHITE & DARK CLIP ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3002	VR3002 (DARK) VR3004 (WHITE)	STOP (E-E)	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK	OSCILLO-SCOPE	190±5% (WHITE CLIP) 55±5% (DARK CLIP)	

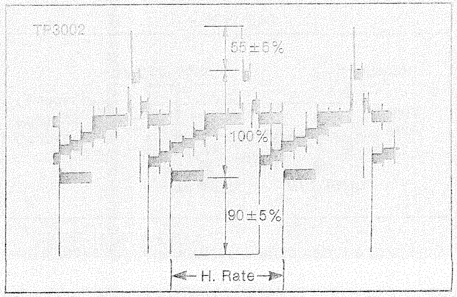


Figure E20

Note:
Before this adjustment "Sync Tip & Deviation Adjustment" should be completed.

1. Set the VIDEO LEVEL Switch to AGC position.

2-4-8 CHROMINANCE RECORDING CURRENT ADJUSTMENT (DUB IN)

TP	ADJ.	MODE	INPUT
TP5003 (HOT) TP5004 (GND)	VR3009 VR8005	REC/PLAY	COLOUR BAR SIGNAL FROM SOURCE VCR
TAPE	**M. EQ.**	**SPEC.**	
BLANK	OSCILLO-SCOPE	28±2mVp-p	

* Notes:
1. Turn VR3009 so that the luminance recording current becomes minimum.
2. After this adjustment "Rec Current Adjustment (Luminance)" shoult be performed.

1. Set the switches to the following position.
   - * Input Select Switch – DUB position
   - * HD REC switch – ON position
2. Connect a 7–pin dubbing cable between second AG–6500 (as colour bar signal source) and the AG–6500 (to be adjusted).
3. Playback the self recorded colour bar tape on the second AG–6500.
4. Place the Deck in the REC/PLAY mode.
5. Connect the scope to TP5003 (HOT) and TP5004 (GND).
6. Adjust VR8005 so that cyan level becomes 28 +- 2mVp–p.

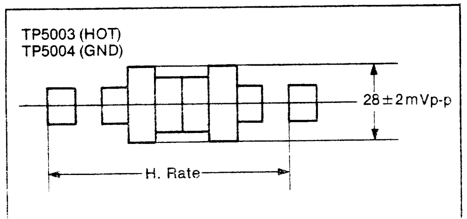

TP5003 (HOT)
TP5004 (GND)
28±2mVp-p
H. Rate

Figure E21

2-4-9. REC CURRENT ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP5003 (HOT) TP5004 (GND) TP5009 (HOT) TP5010 (GND)	VR3009 VR8003 VR5005	REC/PLAY	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK	OSCILLO-SCOPE	30±2mVp-p (C) 130±5mVp-p (Y)	

* Note:
Turn VR3009 so that the luminance recording current becomes minimum.

1. Set the switches to the following position.
   - * Video level Switch – AGC position
   - * HD REC Switch – ON position
2. Turn VR3009 in fully counter–clockwise from parts side.
3. Connect the scope to TP5003 (HOT) TP5004 (GND).
4. Adjust VR8003 so that the cyan level becomes 30 +- 2mVp–p.
5. Connect the scope to TP5009 (HOT) and TP5010 (GND).
6. Adjust VR5005 so that the cyan level becomes 30 +- 2mVp–p. (Figure E22)
7. Adjust VR3009 so that the sync tip level becomes 130 +- 5mVp–p. (Figure E22).

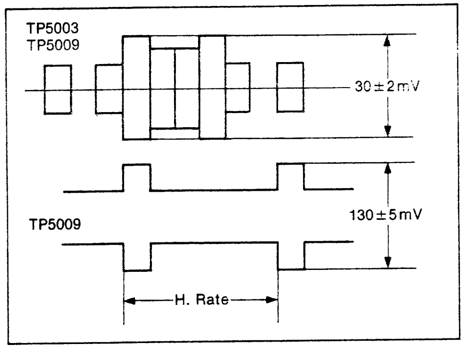

TP5003
TP5009
30±2mV
130±5mV
TP5009
H. Rate

Figure E22

2-4-10. HEAD AMP ADJUSTMENT (1)

TP	ADJ.	MODE	INPUT
TP3007	VR5001 (R ch) VR5002 (L ch)	SELF RECORDING	VIDEO SWEEP
TAPE	**M. EQ.**	**SPEC.**	
BLANK	VIDEO SWEEP/ OSCILLO-SCOPE	0.1MHz : 3MHz=1 : 0.74 (−1dB)	

1. Adjust the picture VR to the centre position.
2. Set the sweep generator output as shown in Figure E23.

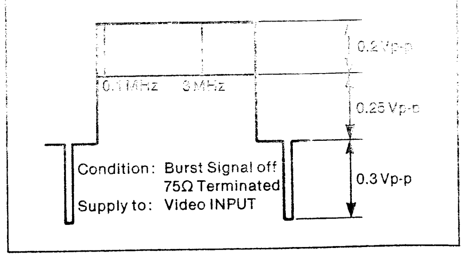

0.2Vp-p
0.1MHz
3MHz
0.25Vp-p
0.3Vp-p
Condition: Burst Signal off
75Ω Terminated
Supply to: Video INPUT

Figure E23

3. Turn VR3015 in full clockwise from solder side.
4. Make a short recording and play back the portion just recorded.
5. Connect the scope to TP3007.
6. Adjust VR5001 (Rch) so that 0.1MHz and 3MHz portions become A : B = 1 : 0.74.
7. Adjust VR5002 (Lch) so that 0.1MHz and 3MHz portions become A : B = 1 : 0.74.

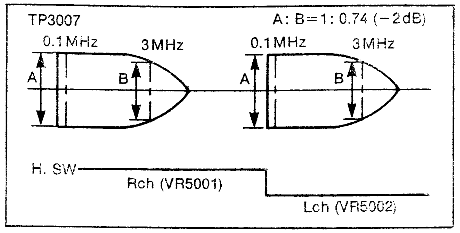

TP3007
A: B=1: 0.74 (−2dB)
0.1MHz
3MHz
0.1MHz
3MHz
A
B
A
B
H. SW
Rch (VR5001)
Lch (VR5002)

Figure E24

2-4-11. COSINE CORRECTOR ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3007	VR3015	SELF-RECORDING	VIDEO SWEEP
TAPE	**M. EQ.**	**SPEC.**	
BLANK	VIDEO SWEEP/ OSCILLO-SCOPE	0.1MHz : 2MHz=1 : 1.12 (+1dB)	

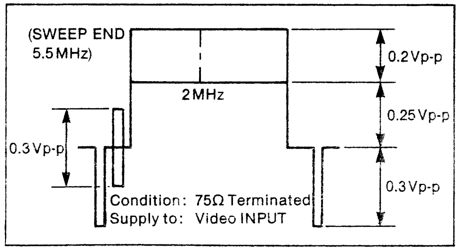

(SWEEP END 5.5MHz)
0.2Vp-p
2MHz
0.25Vp-p
0.3Vp-p
0.3Vp-p
Condition: 75Ω Terminated
Supply to: Video INPUT

Figure E25

Note:
Before this adjustment "Head Amp (1) Adjustment" must be should becompleted.

1. Adjust the picture VR to the centre position.
2. Set the sweep generator output as shown Figure E25 and make a short recording.

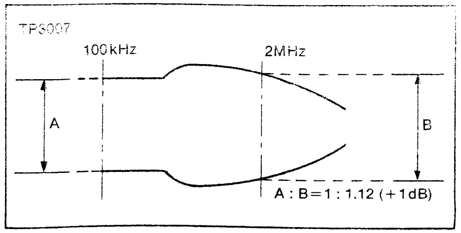

TP3007
100kHz
2MHz
A
B
A : B=1 : 1.12 (+1dB)

Figure E26

3. Play back the just–recorded portion. Adjust VR3015 so that 100kHz and 2MHz portions become A (1):B (1.12) as shown in Figure E26.

2-4-12. HEAD AMP ADJUSTMENT (2)

TP	ADJ.	MODE	INPUT
TP3007	VR5003 (R' ch) VR5004 (R" ch)	STILL PLAYBACK	VIDEO SWEEP
TAPE	**M. EQ.**	**SPEC.**	
SELF-RECORDED TAPE	VIDEO SWEEP/ OSCILLO-SCOPE	0.1MHz : 2MHz=1 : 1	

* Notes:
Before this adjustment "COSINE CORRECTION Adjustment" should be completed.

1. Set the sweep generator output as shown in Figure E23.
2. Make a short recording and play back the portion just recorded in still mode.
3. Connect the scope to TP3007.
4. Adjust VR5003 (R'ch) so that 0.1MHz and 2MHz portions become A : B = 1 : 1.
5. Adjust VR5004 (R"ch) so that 0.1MHz and 2MHz portions become A : B = 1 : 1.

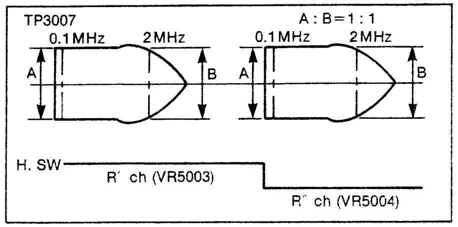

TP3007
A : B=1 : 1
0.1MHz
2MHz
0.1MHz
2MHz
A
B
A
B
H. SW
R' ch (VR5003)
R" ch (VR5004)

Figure E27

2-4-13. CCD INPUT LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3017	VR3010	STOP (E-E)	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK	OSCILLO-SCOPE	1.3±0.1Vp-p	

1. Supply a colour bar signal to the Video Input.
2. Connect the scope to TP3017.
3. Adjust VR3010 so that the Video level becomes 1.3 +- 0.1 Vp–p

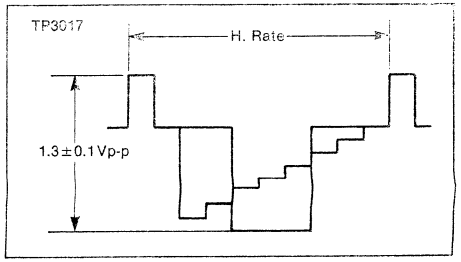

TP3017
H. Rate
1.3±0.1Vp-p

Figure E28

2-4-14. CCD REFERENCE OSC ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3020	C3220	STOP (E-E)	
TAPE	**M. EQ.**	**SPEC.**	
BLANK	FREQUENCY COUNTER	13.30085 MHz ± 50 Hz	

1. Adjust C3020 so that the frequency becomes 13,300857MHz +- 50 Hz.

2-4-15. LINE CORRELATION ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3018	VR3021	STOP (E-E)	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK	OSCILLO-SCOPE	V=MINIMUM	

* Note:
Before this adjustment "CCD Reference OSC Adjustment" should be completed.

1. Supply a colour bar signal to the Video Input.
2. Connect the scope to TP3018.
3. Adjust VR3021 so that level "A" becomes

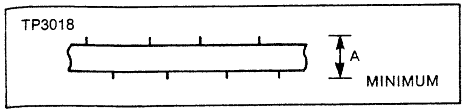


Figure E29

2-4-16. NOISE CANCELLATION LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3009	VR3014	STOP (E-E)	VIDEO SWEEP
TAPE	**M. EQ.**	**SPEC.**	
BLANK	VIDEO SWEEP/ OSCILLO-SCOPE	$A=2.5^{+0.1}_{-0.2}$ MHz	

1. Set the sweep generator output as shown in Figure E30.

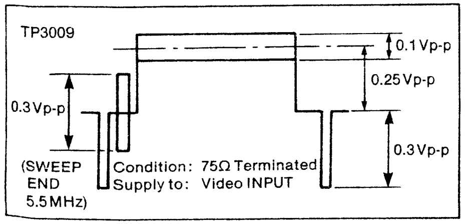


Figure E30

1. Connect the scope to TP3009.
2. Turn VR3020 in fully clockwise from solder side.
3. Adjust VR3014 so that frequency of point "A" becomes 2.5 +- 0.1+0.2MHz.

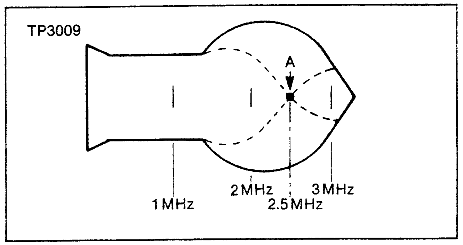


Figure E31

2-4-17. BORDER-LINE ENHANCE LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3009	VR3020	PLAY	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
COLOUR BAR RECOR-DED TAPE	OSCILLO-SCOPE	A=0.3~0.31 Vp-p	

1. Make a short recording and play back the portion just recorded.
2. Connect the scope to TP3009.
3. Adjust VR3020 so that H-SYNC peak level "a" becomes 0.3 ~ 0.31 Vp-p.

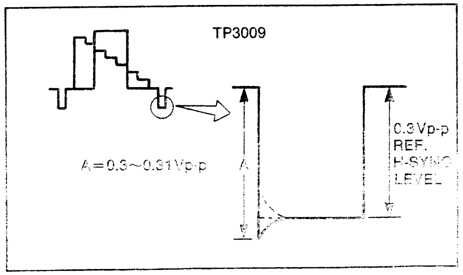


Figure E32

2-4-18. RECURSIVE FILTER ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3014	VR3019 L3039	STOP (E-E)	COLOUR BAR SIGNAL, 2T
TAPE	**M. EQ.**	**SPEC.**	
BLANK	OSCILLO-SCOPE	A=MINIMUM	

1. Supply a colour bar signal to the Video Input.
2. Connect the scope to TP3014.
3. Adjust VR3019 and L3039 so that level "A" becomes minimum.

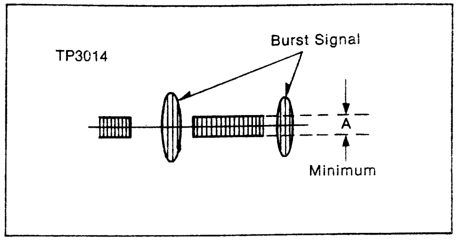


Figure E33

2-4-19. VIDEO OUTPUT LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
VIDEO OUT	VR3023 VR3011	SELF RECORDING	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
	WAVEFORM MONITOR	140±4.2IRE (VIDEO LEVEL) 90±3.5IRE (CYAN LEVEL)	

* Note:
Before this adjustment "Recursive Filter Adjustment" and "CCD Input Level Adjustment" should be completed.

1. Set the VIDEO LEVEL Switch to AGC position.
2. Supply the Video Output Signal to a waveform monitor.
3. Adjust VR3023 so that the video level becomes 140 +- 4.2 IRE.
4. Adjust VR3011 so that the cyan level becomes 90 +- 3.5 IRE.

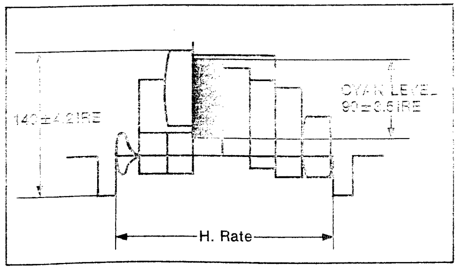


Figure E34

2-4-20. DUB OUTPUT LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3007	VR3012	STOP (E-E)	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK	OSCILLO-SCOPE	1±0.1 Vp-p	

1. Set the VIDEO LEVEL Switch to AGC position.
2. Connect a 1k ohm resistor between DUB OUT Pin-1 and Pin-2.

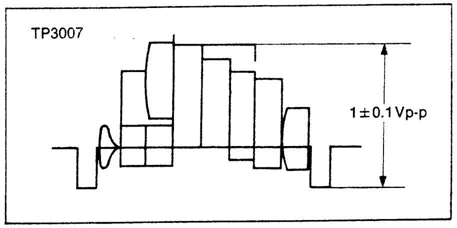


Figure E35

2-4-21. DIFFERENTIAL GAIN ADJUSTMENT

TP	ADJ.	MODE	INPUT
VIDEO OUT	VR8004	SELF-RECORDING	5 STEP VIDEO SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK	WAVE FORM MONITOR	A=+5%	

* Note:
Before this adjustment, "Dub Output Level Adjustment" should be completed.

1. Supply a 5 step Video Signal to the video Input and make a short recording.
2. Play back the just recorded portion.
3. Supply the Video Output signal to a waveform monitor.
4. Adjust VR8004 so that the level A becomes + 5%

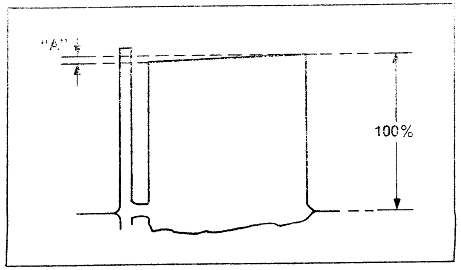


Figure E36

2-4-22. DUB CHROMA OUTPUT LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP8011	VR8006	PLAYBACK	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
COLOUR BAR SELF-RECORDED TAPE	OSCILLO-SCOPE	900±20mV (CYAN LEVEL)	

1. Connect a 1k ohm resistor and a 50VluF capacitor to 7Pin Dub Out as shown Figure E37.

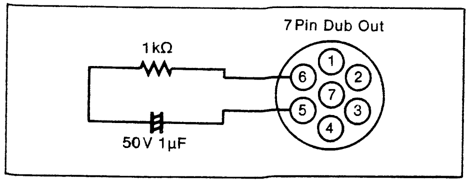


Figure E37

2. Play back the colour bar self recorded tape.

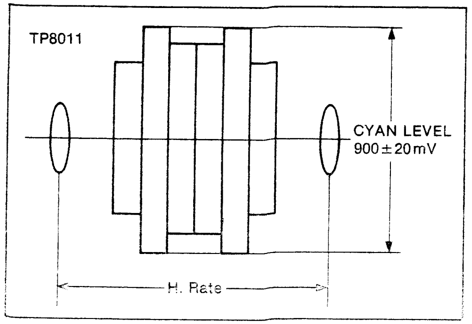


Figure E38

2-4-23. V. PULSE LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3009	VR3017	STIL PLAYBACK	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
COLOUR BAR SELF-RECORDED TAPE	OSCILLO-SCOPE	V. PULSE LEVEL= H. SYNC LEVEL ±0.05V	

1. Play back the colour bar self recorded tape in still mode.
2. Adjust VR3017 so that peak levels of V pulse and H. sync become the same peak (+– 0.05 V) as shown Figure E39.

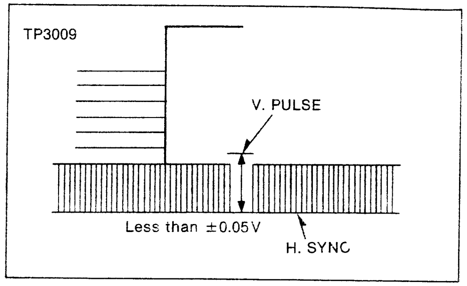


Figure E39

2-4-24. VIDEO LEVEL METER ADJUSTMENT

TP	ADJ.	MODE	INPUT
VIDEO LEVEL METER	VR3008	STOP (E-E)	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
		SEE FIGURE E40	

1. Set the VIDEO LEVEL Switch to AGC position.
2. Adjust VR3008 so that the needle of VIDEO LEVEL METER becomes at point "A" as shown Figure E40.

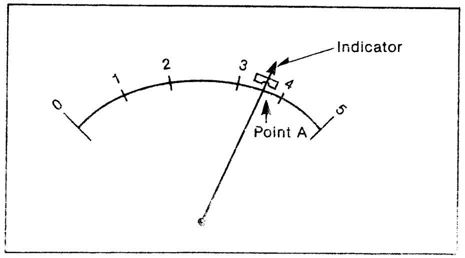


Figure E40

2-4-25. TRACKING METER ADJUSTMENT

TP	ADJ.	MODE	INPUT
TRACKING METER	VR3007	PLAYBACK	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
COLOUR BAR SELFE-RECORDED TAPE		SEE FIGURE E41	

* Note:
Before this adjustment "Head Amp (1), (2) Adjustment, Cosine Correct Adjustment and Tracking Fix Adjustment" should be completed.

1. Play back the colour bar recorded tape.
2. Adjust the TRACKING VR on the front panel at fixed position.
3. Adjust VR 3007 so that the needle of TRACKING METER becomes at point B as shown in Figure E41.

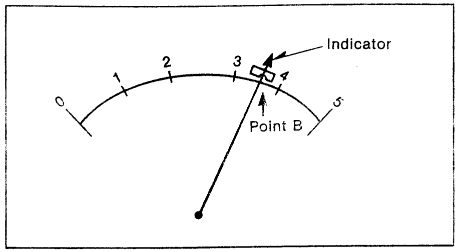


Figure E41

2-4-26. RF OUTPUT LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3008	VR3013	SELF-RECORDING	COLOUR BAR SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
COLOUR BAR SELFE-RECORDED TAPE	OSCILLO-SCOPE	1.0±0.1Vp-p	

Note:
Before this adjustment "Head Amp (1), (2) Adjustment, Cosine Correct Adjustment and Tracking Fix Adjustment" should be completed.

1. Play back the colour bar self–recorded tape.

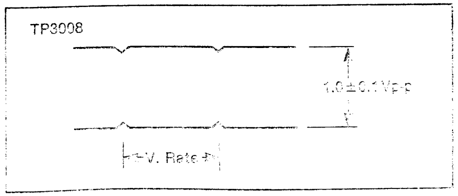


Figure E42

2-5. NORMAL AUDIO SECTION

Note:
1. Unless otherwise specified, set the following switches to the following positions.

SWITCH	POSITION
AUDIO MONITOR (HD/NORM)	NORM
DOLBY NR	OFF
LIMITER	OFF

2-5-1. AUDIO INPUT LEVEL ADJUSTMENT

<table>
<tr><th>TF</th><th colspan="3">ADJ.</th><th colspan="2">MODE</th><th>INPUT</th></tr>
<tr><td rowspan="3">AUDIO OUT (CH 1) (CH 2)</td><td></td><td>NORMAL</td><td>HD</td><td colspan="2" rowspan="3">STOP</td><td rowspan="3">1kHz −8dBV AUDIO SIGNAL</td></tr>
<tr><td>CH 1</td><td>VR6303</td><td>VR6301</td></tr>
<tr><td>CH 2</td><td>VR6304</td><td>VR6302</td></tr>
<tr><th>TAPE</th><th colspan="3">M. EQ.</th><th colspan="3">SPEC.</th></tr>
<tr><td rowspan="3"></td><td colspan="3" rowspan="3">V.T.V.M or SCOPE</td><td></td><td>NORMAL</td><td>FM</td></tr>
<tr><td>CH 1</td><td colspan="2" rowspan="2">−8dBV±0.2=0.41Vrms =1.1Vp-p</td></tr>
<tr><td>CH6</td></tr>
</table>

1. Set the AUDIO LEVEL, VRs (CH1–NOR/HD, CH2–NOR/HD) on the front panel to the centre detent (fixed) position and supply a audio signal −8dB (= 0.41Vrms = 1.13Vp–p) to the NOR AUDIO INPUTS (CH1, CH2).
2. Adjust VR6303 (NOR–CH1) and VR6304 (NOR–CH2) so that the levels at the NOR/HD OUTPUTS (CH1, CH2) become −8 +– 0.2dB (= 0.39 ~ 0.41 Vrms = 1.1 ~ 1.15 Vp–p).
3. Set the AUDIO MONITOR Switch to the HD position.
4. Adjust VR6301 (HD CH1) and VR6302 (HD CH2) so that the the levels at the NOR/HD Outputs (CH1, CH2) become −8 +– 0.2 dB (=0.39 ~ 0.41Vrms = 1.1 ~ 1.15Vp–p).

2-5-2. AUDIO METER ADJUSTMENT

TP	ADJ.	MODE	INPUT
AUDIO METER	VR4009 (CH1) VR4010 (CH2)	STOP	1kHz −8dBV AUDIO SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
		0±0.5VU	

* Note:
Before this adjustment "Audio Input Level Adjustment" should be completed.

1. Set the AUDIO LEVEL VRs (CH1–NOR/HD, CH2–NOR/HD) to the centre detent (fixed) position and supply a audio signal to the NOR AUDIO INPUTS (CH1, CH2).
2. Set the MONITOR SELECT Switch to the NORM position.
3. Adjust VR4009 (CH1) and VR4010 (CH2) so that the needles of AUDIO LEVEL METER becomes "0" +– 0.5 position.
4. Set the MONITOR SELECT Switch to the NORM position from HD position.
5. Confirm that the needles indication of AUDIO LEVEL METER (CH1, CH2) are "02 +– 1.0.

2-5-3. NORMAL AUDIO PLAYBACK FREQUENCY RESPONSE ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP4001 (CH 1) TP4002 (CH 2)	VR4001 (CH 1) VR4004 (CH 2)	PLAY	
TAPE	**M. EQ.**	**SPEC.**	
VFM8180HMDH PORTION: ③	OSCILLO-SCOPE	400 Hz AND 5 kHz PORTIONS SHOULD BE SAME LEVEL (0±0.5 dB)	

* Notes:
Before atlempting to adjust the Audio Frequency Response, set the VR4001 and VR4004 to the centre position.

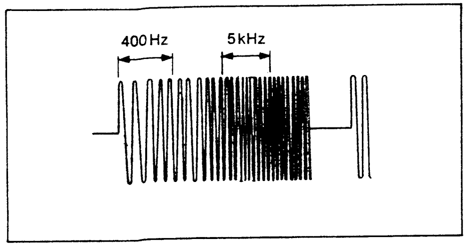


Figure E43

2-5-4. NORMAL AUDIO PLAYBACK GAIN ADJUSTMENT

* Note:
Before this adjustment "Audio Playback Frequency Response Adjustment" should be completed.

TP	ADJ.	MODE	INPUT
TP4001 (CH 1) TP4002 (CH 2)	VR4002 (CH 1) VR4005 (CH 2)	PLAY	
TAPE	**M. EQ.**	**SPEC.**	
VFM8180HMDH PORTION: ③	OSCILLO-SCOPE	300±15 mVp-p (CH 1) 310±15 mVp-p (CH 2)	

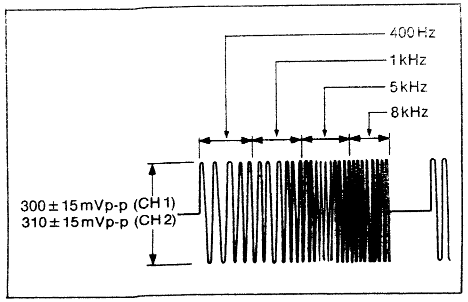


Figure E44

2-5-5. FULL ERASE CURRENT ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP4006	T4001 T4002	REC PLAY	
TAPE	**M. EQ.**	**SPEC.**	
BLANK	FREQUENCY COUNTER/ OSCILLO-SCOPE	70 kHz±1 kHz (T4001) MORE THAN 70 Vp-p (T4002)	

1. Adjust T4001 so that the frequency becomes 70kHz +− 1kHz.
2. Adjust T4002 so that the level becomes maximum and confirm that voltage of TP4006 is more than 70Vp−p.

2-5-6. NORMAL AUDIO ERASE CURRENT ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP4007 (CH 1) TP4008 (CH 2)	T4005 (CH 1) T4006 (CH 2)	EDIT REC PLAY	
TAPE	**M. EQ.**	**SPEC.**	
BLANK	OSCILLO-SCOPE	MAXIMUM (MORE THAN 20 Vp-p)	

1. Sets the INSERT AUDIO Switches (CH1, CH2) to ON positions.
2. Adjust T4005 (CH1) so that the level becomes maximum.
3. Adjust T4006 (CH2) so that the level becomes maximum.
4. Confirm that voltage of TP4007 and TP4008 are more than 20Vp−p.

2-5-7. NORMAL AUDIO BIAS CURRENT ADJUSTMENT

TP	ADJ.	MODE	INPUT
A/C HEAD	T4003 (CH 1) T4004 (CH 2)	REC PLAY	
TAPE	**M. EQ.**	**SPEC.**	
BLANK	V.T.V.M	1.9±0.1 mVrms	

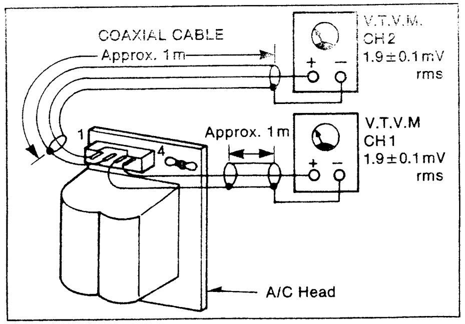


Figure E45

2-5-8. NORMAL AUDIO REC CURRENT ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP4003 (CH 1) TP4004 (CH 2)	VR4003 (CH 1) VR4006 (CH 2)	REC PLAY ↔ PLAY	1 kHz 8 dBV AUDIO SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK	V.T.V.M		

CH1 Adjustment Procedures

1. Set the AUDIO OUT Select Switch to NORM position.
2. Connect the V.T.V.M.s to the deck as shown below.
3. Supply a audio signal to AUDIO IN(NORM/HD).
4. Place the deck in REC PLAY mode.
5. Adjust VR4003 so that the V.T.V.M (2) level becomes 1.5Vp−p, then V.T.V.M (1) level is determine at 0 dB.
6. Play back the just−recorded portion.
7. Read the deflection of V.T.V.M. (1).
8. Place the deck in REC PLAY mode.
9. Revise the VR4003 to deflection of V.T.V.M. (1) at the V.T.V.M. (2).
10. If the REC PLAY mode does not indicates PLAYBACK mode at V.T.V.M. (1), repeat steps 4 to 9 until the REC PLAY mode and PLAYBACK mode are the same.
CH2 Adjustment Procedures are the same as CH1 except the reference numbers of VR and TP.

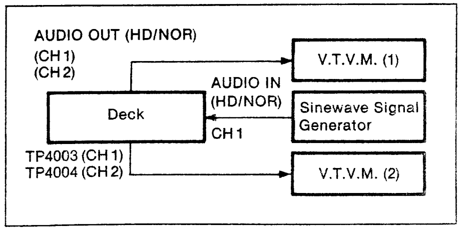


Figure E46

2-5-9. TIME CODE METER ADJUSTMENT

TP	ADJ.	MODE	INPUT
AUDIO (CH2) LEVEL METER	VR4007	REC PLAY	SQUARE WAVE 2 kHz, 1 Vp-p
TAPE	**M. EQ.**	**SPEC.**	
BLANK		0±0.5 VU	

1. Set the TC/AUDIO select switch on the rear panel to T/C position.
2. Supply a 2kHz, 1Vp−p square wave signal to the TIME CODE INPUT.
3. Adjust VR4007 so that the needle of AUDIO CH2 LEVEL METER becomes "0" +− 0.5 point.

2-6. HD AUDIO SECTION

* Note:
1. Unless otherwise specified, set the following switches to the following positions.

SWITCH	POSITION
AUDIO MONITOR (HD/NORM)	HD
DOLBY NR	OFF
LIMITER	OFF

2-6-1. FM CARRIER FREQUENCY ADJUSTMENT

* Notes:
1. Connect the jumper wires between each AUDIO INPUT (HD−CH1, CH2 and NOR−CH1, CH2) and GND.
2. If signal level is too low to trigger frequency counter, adjust VR4304 (CH1) and VR4305 (CH2) to clockwise.

TP	ADJ.	MODE	INPUT
TP4301 (CH 1) TP4302 (CH 2)	VR4303 (CH 1) VR4308 (CH 2)	STOP (E-E)	
TAPE	**M. EQ.**	**SPEC.**	
	FREQUENCY COUNTER	1.4 MHz±10 kHz (CH 1) 1.8 MHz±10 kHz (CH 2)	

2-6-2. FM DEVIATION ADJUSTMENT

1. Factory and Legal Adjustment

TP	ADJ.	MODE	INPUT
TP4301 (CH 1) TP4302 (CH 2)	VR4302 (CH 1) VR4307 (CH 2)	STOP	1 kHz −8 dBV AUDIO SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
	SPECTRUM ANALYZER	fw=100±5 kHz (CH 1/CH 2)	

1. Supply a audio signal to HD AUDIO INPUT (CH1).
2. Connect the spectrum analyzer to TP4301, and set the centre frequency of spectrum analyzer at 1.4MHz portion.
3. Adjust VR4302 so that the width of "fw" portion becomes 100 +− 5kHz.

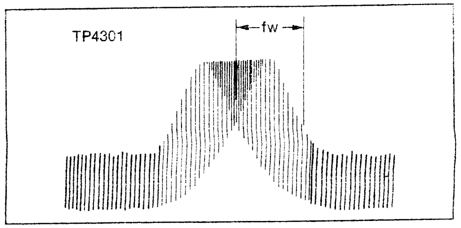


Figure E47

2–13. Removal of the HD Audio C.B.A., System Control C.B.A. and Chrominance C.B.A.

A. HD Audio C.B.A.

1. Unscrew the 2 screws (N). (Figure D20)
2. Lift the C.B.A. out from the unit.
3. Stand the C.B.A. using the C.B.A. standing holes (Q) as shown Figures D21 and D22.

B. System Control C.B.A.

1. Unscrew the 2 scrws (O). (Figure D20)
2. Lift the C.B.A. out from the unit.
3. Stand the C.B.A. using the C.B.A. standing holes (R) as shown Figures D21 and D22.

C. Chrominance C.B.A.

1. Unscrew the 2 screws (P). (Figure D20)
2. Lift the C.B.A. using the C.B.A. standing holes (P) as shown Figures D21 and D22.
3. Stand the C.B.A. out from the unit.

* Note:
To prevent the C.B.A. damage or shock hazard, please pay attention when the C.B.A. in standed as shown in Figure D22.

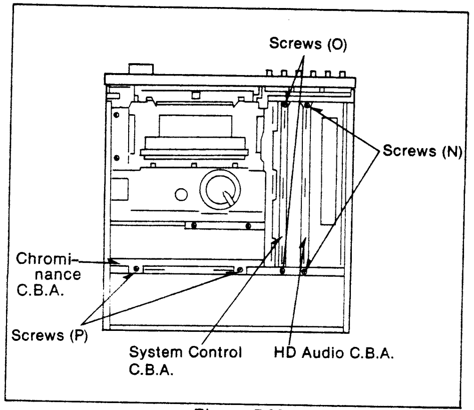

Screws (O)
Screws (N)
Chromi-nance C.B.A.
Screws (P)
System Control C.B.A.
HD Audio C.B.A.

Figure D20

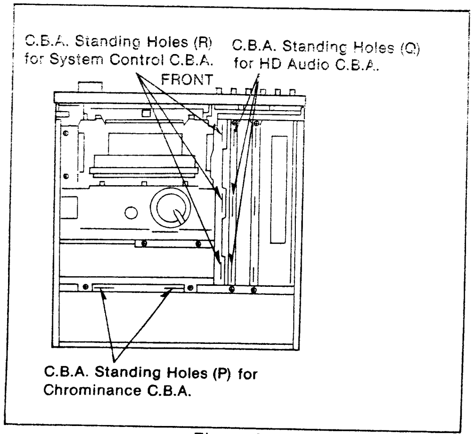

C.B.A. Standing Holes (R) for System Control C.B.A.
C.B.A. Standing Holes (Q) for HD Audio C.B.A.
FRONT
C.B.A. Standing Holes (P) for Chrominance C.B.A.

Figure D21

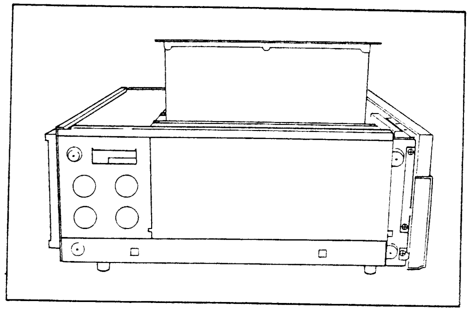


Figure D22

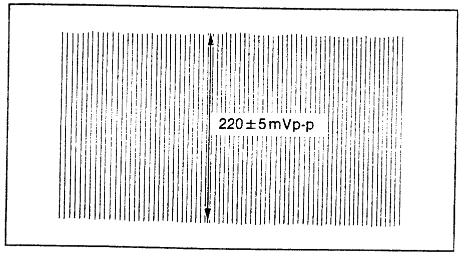


Figure E50

2-5-5. HD AUDIO MUTING LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
AUDIO OUT, TP4304	VR4801	PLAY	
TAPE	**M. EQ.**	**SPEC.**	
VFM8180HMDH PORTION: ②	OSCILLO-SCOPE	ENVELOPE LEVEL "A"×3$^{+0.3}_{-0}$	

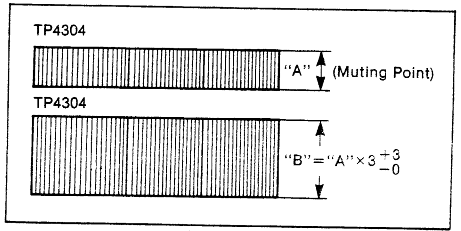
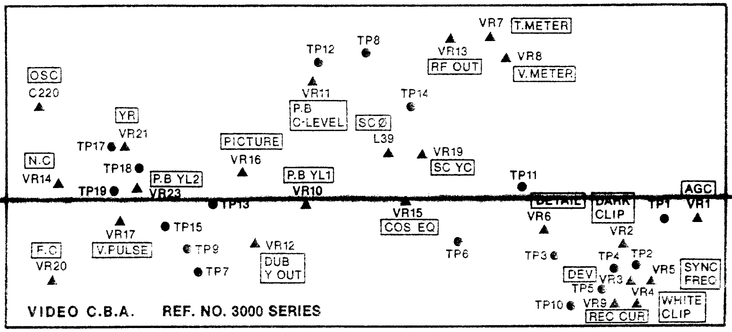


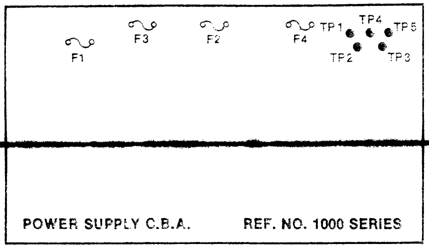
Figure E51

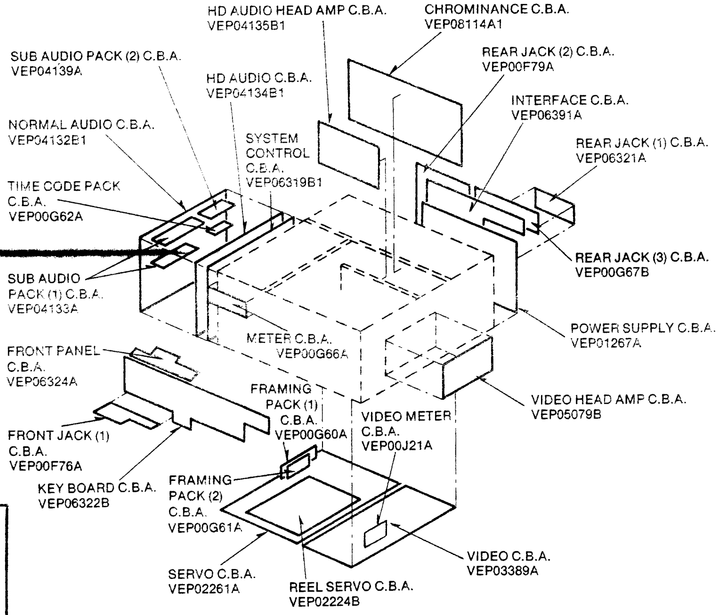
LOCATION OF TEST POINTS & CONTROLS

Video C.B.A. (VEP03389A)

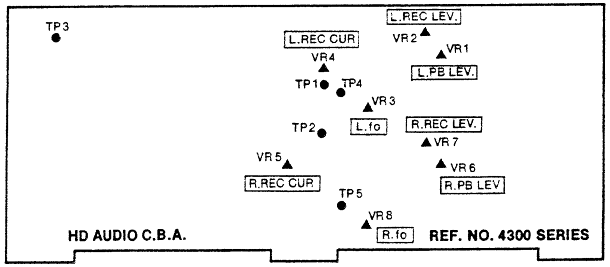

OSC
C220
YR
VR21
TP17
N.C
VR14
TP18
P.B YL2
TP19
VR23
PICTURE
VR16
TP12
VR11
P.B C-LEVEL
TP8
SCØ
L39
P.B YL1
VR10
TP13
VR7
T.METER
VR13
RF OUT
VR8
V.METER
TP14
VR19
SC YC
VR15
COS EQ
TP11
DETAIL
VR6
DARK CLIP
VR2
TP1
AGC
VR1
VR17
V.PULSE
TP15
F.C
VR20
TP9
TP7
VR12
DUB Y OUT
TP6
TP3
TP4
TP2
DEV
VR3
VR5
SYNC FREC
TP5
VR4
TP10
VR9
REC CUR
WHITE CLIP
VIDEO C.B.A.
REF. NO. 3000 SERIES

Power Supply C.B.A. (VEP01267A)

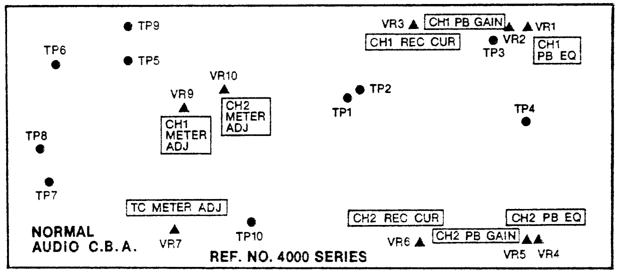

F1
F3
F2
F4
TP1
TP4
TP5
TP2
TP3
POWER SUPPLY C.B.A.
REF. NO. 1000 SERIES


HD AUDIO HEAD AMP C.B.A. VEP04135B1
CHROMINANCE C.B.A. VEP08114A1
SUB AUDIO PACK (2) C.B.A. VEP04139A
REAR JACK (2) C.B.A. VEP00F79A
HD AUDIO C.B.A. VEP04134B1
INTERFACE C.B.A. VEP06391A
NORMAL AUDIO C.B.A. VEP04132B1
SYSTEM CONTROL C.B.A. VEP06319B1
REAR JACK (1) C.B.A. VEP06321A
TIME CODE PACK C.B.A. VEP00G62A
REAR JACK (3) C.B.A. VEP00G67B
SUB AUDIO PACK (1) C.B.A. VEP04133A
METER C.B.A. VEP00G66A
POWER SUPPLY C.B.A. VEP01267A
FRONT PANEL C.B.A. VEP06324A
FRAMING PACK (1) C.B.A. VEP00G60A
VIDEO HEAD AMP C.B.A. VEP05079B
VIDEO METER C.B.A. VEP00J21A
FRONT JACK (1) C.B.A. VEP00F76A
KEY BOARD C.B.A. VEP06322B
FRAMING PACK (2) C.B.A. VEP00G61A
VIDEO C.B.A. VEP03389A
SERVO C.B.A. VEP02261A
REEL SERVO C.B.A. VEP02224B

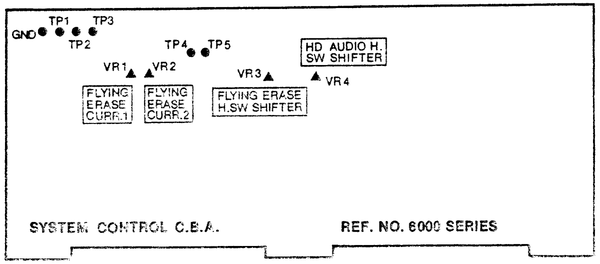
HD Audio C.B.A. (VEP04134B1)


TP3
L.REC LEV.
L.REC CUR
VR2
VR1
VR4
L.PB LEV.
TP1
TP4
VR3
TP2
L.fo
R.REC LEV.
VR7
VR5
VR6
R.REC CUR
R.PB LEV
TP5
VR8
R.fo
HD AUDIO C.B.A.
REF. NO. 4300 SERIES

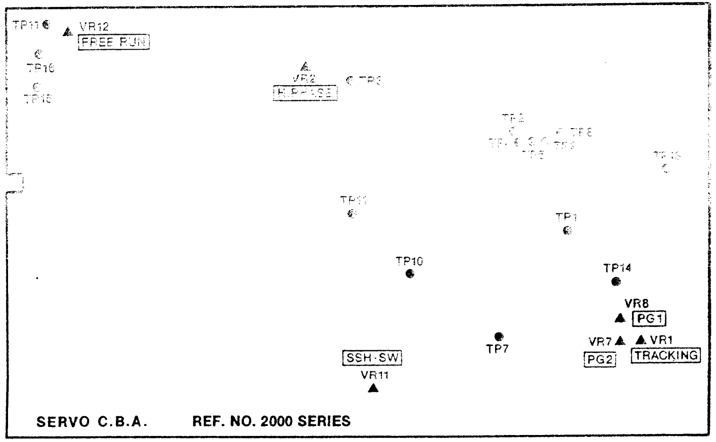
Normal Audio C.B.A. (VEP04132B1)


TP9
TP6
TP5
VR3
CH1 PB GAIN
VR1
CH1 REC CUR
VR2
TP3
CH1 PB EQ
VR10
VR9
CH2 METER ADJ
CH1 METER ADJ
TP2
TP1
TP4
TP8
TP7
TC METER ADJ
VR7
TP10
CH2 REC CUR
CH2 PB EQ
VR6
CH2 PB GAIN
VR5
VR4
NORMAL AUDIO C.B.A.
REF. NO. 4000 SERIES

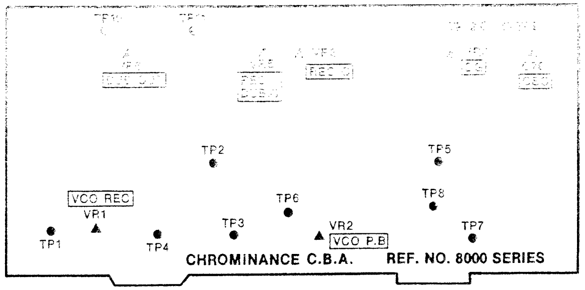
System Control C.B.A. (VEP06319B1)


TP1
TP3
GND
TP2
TP4
TP5
HD AUDIO H. SW SHIFTER
VR1
VR2
VR3
VR4
FLYING ERASE CURR.1
FLYING ERASE CURR.2
FLYING ERASE H.SW SHIFTER
SYSTEM CONTROL C.B.A.
REF. NO. 6000 SERIES

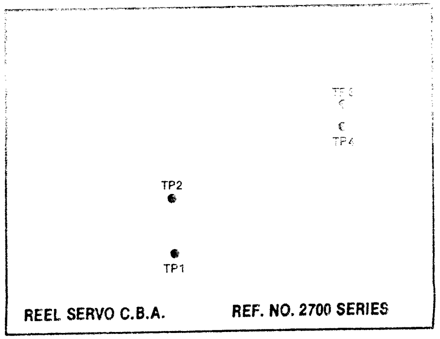
Servo C.B.A. (VEP02261A)


TP11
VR12
FREE RUN
TP16
TP15
VR2
H.PHASE
TP1
TP10
TP14
VR8
PG1
VR7
VR1
PG2
TRACKING
TP7
SSH-SW
VR11
SERVO C.B.A.
REF. NO. 2000 SERIES

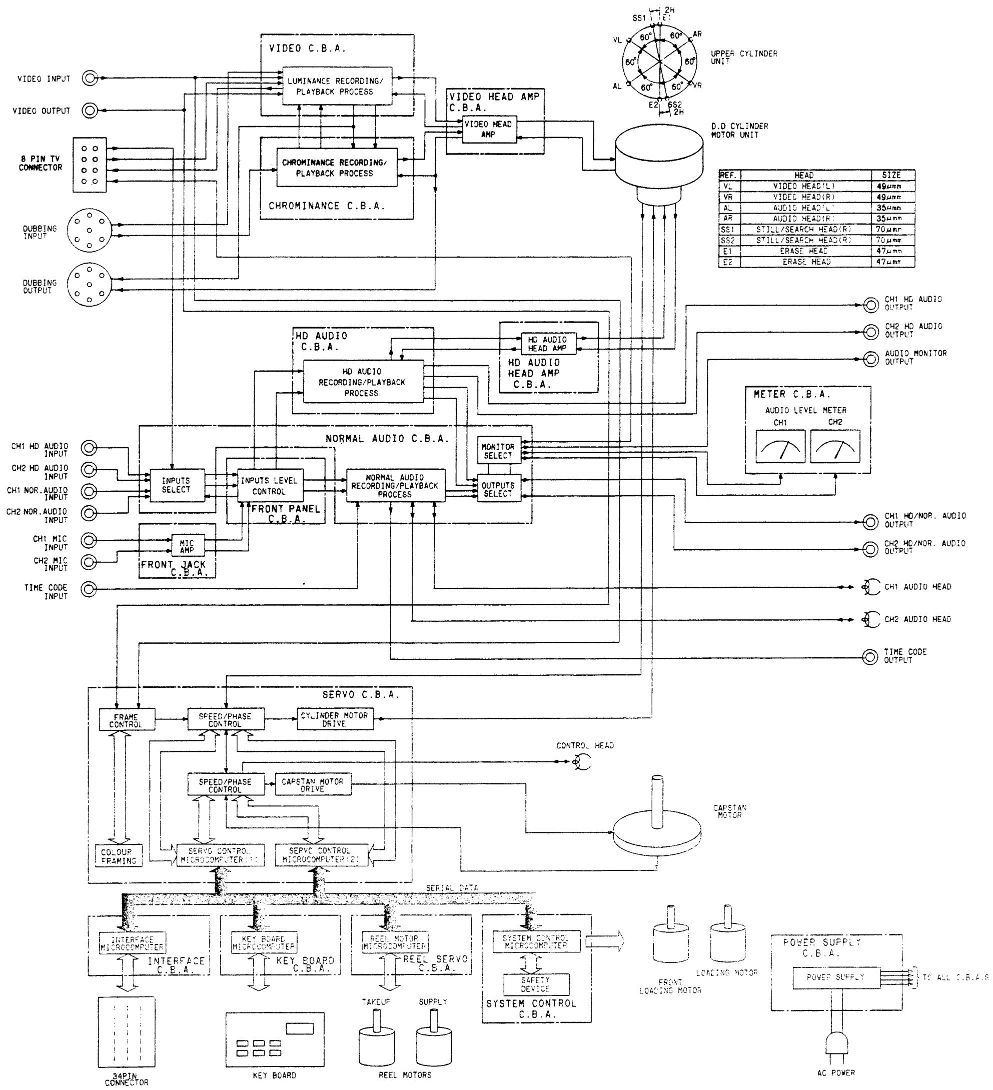
Chrominance C.B.A. (VEP08114A1)


TP2
TP5
VCO REC
VR1
TP6
TP8
TP3
VR2
TP7
TP1
TP4
VCO P.B
CHROMINANCE C.B.A.
REF. NO. 8000 SERIES

Reel Servo C.B.A. (VEP02224B)

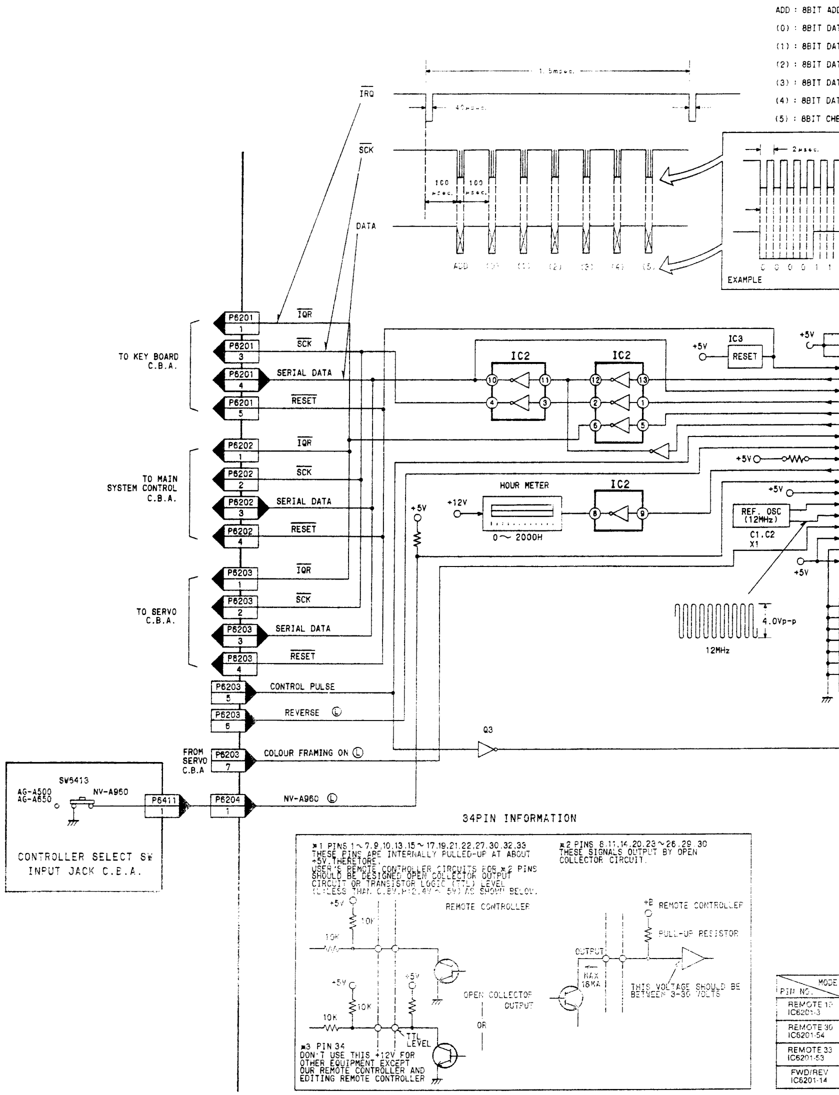

TP4
TP2
TP1
REEL SERVO C.B.A.
REF. NO. 2700 SERIES

OVERALL BLOCK DIAGRAM


VIDEO INPUT
VIDEO OUTPUT
8 PIN TV CONNECTOR
DUBBING INPUT
DUBBING OUTPUT
VIDEO C.B.A.
LUMINANCE RECORDING/ PLAYBACK PROCESS
CHROMINANCE RECORDING/ PLAYBACK PROCESS
CHROMINANCE C.B.A.
VIDEO HEAD AMP C.B.A.
VIDEO HEAD AMP
UPPER CYLINDER UNIT
SS1 E1 2H VL AR AL VR E2 SS2 2H 60°
D.D CYLINDER MOTOR UNIT
CH1 HD AUDIO OUTPUT
CH2 HD AUDIO OUTPUT
AUDIO MONITOR OUTPUT
HD AUDIO C.B.A.
HD AUDIO RECORDING/PLAYBACK PROCESS
HD AUDIO HEAD AMP
HD AUDIO HEAD AMP C.B.A.
METER C.B.A.
AUDIO LEVEL METER
CH1 CH2
NORMAL AUDIO C.B.A.
MONITOR SELECT
CH1 HD AUDIO INPUT
CH2 HD AUDIO INPUT
CH1 NOR. AUDIO INPUT
CH2 NOR. AUDIO INPUT
CH1 MIC INPUT
CH2 MIC INPUT
TIME CODE INPUT
INPUTS SELECT
INPUTS LEVEL CONTROL
FRONT PANEL C.B.A.
NORMAL AUDIO RECORDING/PLAYBACK PROCESS
OUTPUTS SELECT
MIC AMP
FRONT JACK C.B.A.
CH1 HD/NOR. AUDIO OUTPUT
CH2 HD/NOR. AUDIO OUTPUT
CH1 AUDIO HEAD
CH2 AUDIO HEAD
TIME CODE OUTPUT
SERVO C.B.A.
FRAME CONTROL
SPEED/PHASE CONTROL
CYLINDER MOTOR DRIVE
CONTROL HEAD
SPEED/PHASE CONTROL
CAPSTAN MOTOR DRIVE
CAPSTAN MOTOR
COLOUR FRAMING
SERVO CONTROL MICROCOMPUTER(1)
SERVO CONTROL MICROCOMPUTER(2)
SERIAL DATA
INTERFACE MICROCOMPUTER
INTERFACE C.B.A.
KEY BOARD MICROCOMPUTER
KEY BOARD C.B.A.
REEL MOTOR MICROCOMPUTER
REEL SERVO C.B.A.
SYSTEM CONTROL MICROCOMPUTER
SAFETY DEVICE
SYSTEM CONTROL C.B.A.
FRONT LOADING MOTOR
LOADING MOTOR
POWER SUPPLY C.B.A.
POWER SUPPLY
TO ALL C.B.A.S
34PIN CONNECTOR
KEY BOARD
TAKEUP
SUPPLY
REEL MOTORS
AC POWER

REF.	HEAD	SIZE
VL	VIDEO HEAD(L)	49μmm
VR	VIDEO HEAD(R)	49μmm
AL	AUDIO HEAD(L)	35μmm
AR	AUDIO HEAD(R)	35μmm
SS1	STILL/SEARCH HEAD(R)	70μmm
SS2	STILL/SEARCH HEAD(R)	70μmm
E1	ERASE HEAD	47μmm
E2	ERASE HEAD	47μmm

INTERFACE BLOCK DIAGRAM


IRQ
SCK
DATA
1.5msec.
40μsec.
100 μsec.
100 μsec.
ADD (0) (1) (2) (3) (4) (5)
2μsec.
16μsec.
0 0 0 0 1 1 0 1 (0D)
EXAMPLE
TO KEY BOARD C.B.A.
P6201 1 IRQ
P6201 3 SCK
P6201 4 SERIAL DATA
P6201 5 RESET
TO MAIN SYSTEM CONTROL C.B.A.
P6202 1 IRQ
P6202 2 SCK
P6202 3 SERIAL DATA
P6202 4 RESET
TO SERVO C.B.A.
P6203 1 IRQ
P6203 2 SCK
P6203 3 SERIAL DATA
P6203 4 RESET
P6203 5 CONTROL PULSE
P6203 6 REVERSE Ⓛ
FROM SERVO C.B.A
P6203 7 COLOUR FRAMING ON Ⓛ
P6204 1 NV-A960 Ⓛ
SW5413
AG-A500 AG-A650
NV-A960
P6411 1
CONTROLLER SELECT SW INPUT JACK C.B.A.
IC2
IC3 RESET
+5V
+12V
HOUR METER
0～2000H
REF. OSC (12MHz)
C1.C2 X1
12MHz
4.0Vp-p
Q3
IC1

ADD : 8BIT ADDRESS CODE
(0) : 8BIT DATA
(1) : 8BIT DATA
(2) : 8BIT DATA
(3) : 8BIT DATA
(4) : 8BIT DATA
(5) : 8BIT CHECK SUM CODE

IC1

PIN	PORT	MODE/COMMAND	ACTIVE		MODE/COMMAN
64	VCC	+5V	5V	L	REC FROM REM
63	VDD	+5V	5V	L	PLAY FROM REM
43	AVCC	+5V	5V	L	FF FROM REMO
28	RESET	RESET	L	L	REW FROM REM
17	TXD	SERIAL DATA OUT	--	L	STOP FROM REM
18	RXD	SERIAL DATA IN	--	L	PAUSE FROM REM
19	SCK	SERIAL CLOCK	--	L	CASSETTE IN
21	TO	INTERRUPT REQUEST	--	L	CUT IN MODE
23	PC6	SERIAL DATA CONTROL	--	L	FWD PLAY FROM R
22	CI	CTL PULSE(25Hz)	⎍⎍	L	SERVO LOCK
24	PC7	REVERSE MODE	L	L	STEP FROM REM
49	PF2	PAL MODEL	H	L	REVERSE MOD
48	PF1	EXCEPT STOP.EJECT MODE	H	L	CUT OUT FROM R
47	PF0	NV-A960 POSITION	L	L	EDIT FROM REM
42	VA REF	+5V	5V	L	REV FROM REMO
30	X2	12MHz REF. OSC	--	--	REMOTE ①
31	X1	12MHz REF. OSC	--	L	START MARK
50	PF3	COLOUR FRAMING ON	L	L	EJECT MODE
25	NM1	+5V	5V	L	INSERT AUDIO 1
26	INT1	GND	GND	L	REC MODE
27	MODE1	+5V	5V	L	PLAY MODE
44	RD	NOT USED	OPEN	L	FF MODE
45	WR		OPEN	L	REW MODE
46	ALE		OPEN	L	INSERT AUDIO 2
59	PD4		GND	L	PAUSE MODE
55	PD0		GND	--	REMOTE ③
56	PD1		GND	L	CUT IN "ON"
57	PD2		GND	L	INSERT VIDEO
58	PD3		GND	--	REMOTE
29	MODE	GND	GND	GND	NOT USED
32	VSS	GND	GND	GND	
33	AVSS	GND	GND	GND	

34PIN INFORMATION

※1 PINS 1～7.9.10.13.15～17.19.21.22.27.30.32.33
THESE PINS ARE INTERNALLY PULLED-UP AT ABOUT +5V.THERETORE,
USER'S REMOTE CONTROLLER CIRCUITS FOR ※2 PINS SHOULD BE DESIGNED OPEN COLLECTOR OUTPUT CIRCUIT OR TRANSISTOR LOGIC (TTL) LEVEL (L:LESS THAN 0.8V,H:2.4V～5V) AS SHOWN BELOW.

※2 PINS 8.11.14.20.23～26.29.30
THESE SIGNALS OUTPUT BY OPEN COLLECTOR CIRCUIT.

※3 PIN 34
DON'T USE THIS +12V FOR OTHER EQUIPMENT EXCEPT OUR REMOTE CONTROLLER AND EDITING REMOTE CONTROLLER

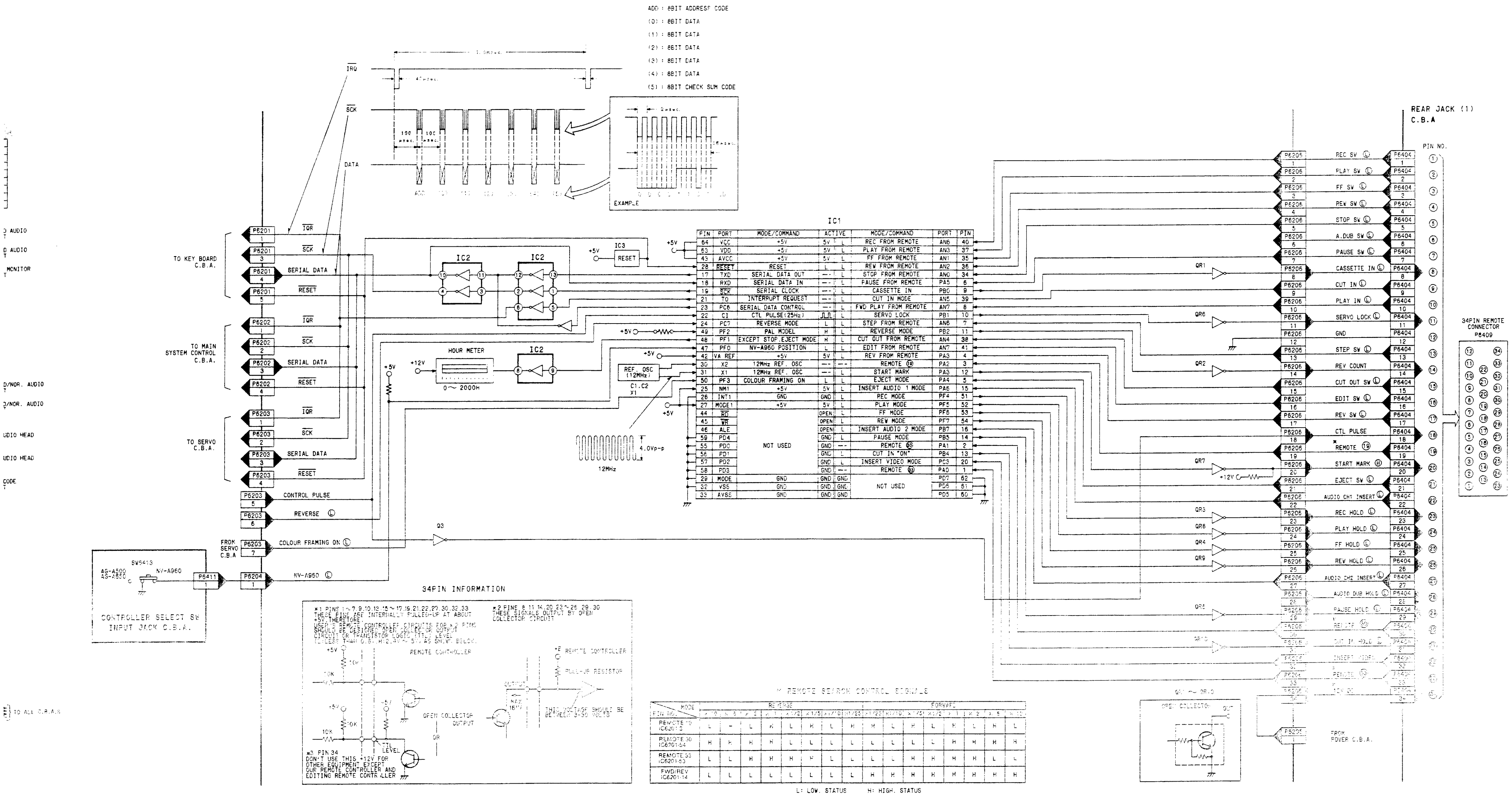
+5V
10K
10K
REMOTE CONTROLLER
OPEN COLLECTOR OUTPUT
OR
TTL LEVEL
+B REMOTE CONTROLLER
PULL-UP RESISTOR
OUTPUT
MAX 16MA
THIS VOLTAGE SHOULD BE BETWEEN 3-30 VOLTS

※ REMOTE SEARCH CONTROL ST

PIN NO. \ MODE	REVERSE									
	×10	×5	×2	×1	×1/2	×1/5	×1/10	×1/25	×1/25	×1/10
REMOTE 1③ IC6201-3	L	H	L	H	L	H	L	H	H	L
REMOTE 30 IC6201-54	H	H	H	H	L	L	L	L	L	L
REMOTE 33 IC6201-53	L	L	H	H	H	H	L	L	L	L
FWD/REV IC6201-14	L	L	L	L	L	L	L	L	H	H

L: LOW. STATUS H: HIGH. ST

INTERFACE BLOCK DIAGRAM


ADD : 8BIT ADDRESS CODE
(0) : 8BIT DATA
(1) : 8BIT DATA
(2) : 8BIT DATA
(3) : 8BIT DATA
(4) : 8BIT DATA
(5) : 8BIT CHECK SUM CODE
IRQ
SCK
DATA
100 µsec.
100 µsec.
EXAMPLE
TO KEY BOARD C.B.A.
TO MAIN SYSTEM CONTROL C.B.A.
TO SERVO C.B.A.
FROM SERVO C.B.A
P6201
P6202
P6203
P6204
P6411
SERIAL DATA
RESET
CONTROL PULSE
REVERSE Ⓛ
COLOUR FRAMING ON Ⓛ
NV-A960 Ⓛ
SW5413
AG-A500
AG-A550
NV-A960
CONTROLLER SELECT SW INPUT JACK C.B.A.
IC2
IC3
RESET
+5V
+12V
HOUR METER
0 ~ 2000H
REF. OSC (12MHz)
C1,C2
X1
4.0Vp-p
12MHz
Q3
QR1
QR6
QR2
QR7
QR3
QR8
QR4
QR9
QR5
QR10
IC1
REAR JACK (1) C.B.A
PIN NO.
34PIN REMOTE CONNECTOR P6409
P6205
P6206
P6404
REC SW Ⓛ
PLAY SW Ⓛ
FF SW Ⓛ
REW SW Ⓛ
STOP SW Ⓛ
A.DUB SW Ⓛ
PAUSE SW Ⓛ
CASSETTE IN Ⓛ
CUT IN Ⓛ
PLAY IN Ⓛ
SERVO LOCK Ⓛ
GND
STEP SW Ⓛ
REV COUNT
CUT OUT SW Ⓛ
EDIT SW Ⓛ
REV SW Ⓛ
CTL PULSE
* REMOTE ⑲
START MARK Ⓗ
EJECT SW Ⓛ
AUDIO CH1 INSERT Ⓛ
REC HOLD Ⓛ
PLAY HOLD Ⓛ
FF HOLD Ⓛ
REW HOLD Ⓛ
AUDIO CH2 INSERT Ⓛ
AUDIO DUB HOLD Ⓛ
PAUSE HOLD Ⓛ
* REMOTE ㉚
CUT IN HOLD Ⓛ
INSERT VIDEO
* REMOTE ㉝
* 12V DC
FROM POWER C.B.A.
QR1 ~ QR10
OPEN COLLECTOR
OUT

IC1

PIN	PORT	MODE/COMMAND	ACTIVE		MODE/COMMAND	PORT	PIN
64	VCC	+5V	5V	L	REC FROM REMOTE	AN6	40
63	VDD	+5V	5V	L	PLAY FROM REMOTE	AN3	37
43	AVCC	+5V	5V	L	FF FROM REMOTE	AN1	35
28	RESET	RESET	L	L	REW FROM REMOTE	AN2	36
17	TXD	SERIAL DATA OUT	--	L	STOP FROM REMOTE	AN0	34
18	RXD	SERIAL DATA IN	--	L	PAUSE FROM REMOTE	PA5	6
19	SCK	SERIAL CLOCK	--	L	CASSETTE IN	PB0	9
21	T0	INTERRUPT REQUEST	--	L	CUT IN MODE	AN5	39
23	PC6	SERIAL DATA CONTROL	--	L	FWD PLAY FROM REMOTE	AN7	8
22	CI	CTL PULSE(25Hz)	⎍⎍	L	SERVO LOCK	PB1	10
24	PC7	REVERSE MODE	L	L	STEP FROM REMOTE	AN6	7
49	PF2	PAL MODEL	H	L	REVERSE MODE	PB2	11
48	PF1	EXCEPT STOP.EJECT MODE	H	L	CUT OUT FROM REMOTE	AN4	38
47	PF0	NV-A960 POSITION	L	L	EDIT FROM REMOTE	AN7	41
42	VA REF	+5V	5V	L	REV FROM REMOTE	PA3	4
30	X2	12MHz REF. OSC	--	--	REMOTE ⑲	PA2	3
31	X1	12MHz REF. OSC	--	L	START MARK	PA3	12
50	PF3	COLOUR FRAMING ON	L	L	EJECT MODE	PA4	5
25	NM1	+5V	5V	L	INSERT AUDIO 1 MODE	PA6	15
26	INT1	GND	GND	L	REC MODE	PF4	51
27	MODE1	+5V	5V	L	PLAY MODE	PF5	52
44	RD	NOT USED	OPEN	L	FF MODE	PF6	53
45	WR		OPEN	L	REW MODE	PF7	54
46	ALE		OPEN	L	INSERT AUDIO 2 MODE	PB7	16
59	PD4		GND	L	PAUSE MODE	PB5	14
55	PD0		GND	--	REMOTE ㉚	PA1	2
56	PD1		GND	L	CUT IN "ON"	PB4	13
57	PD2		GND	L	INSERT VIDEO MODE	PC3	20
58	PD3		GND	--	REMOTE ㉝	PA0	1
29	MODE	GND	GND	GND	NOT USED	PD7	62
32	VSS	GND	GND	GND		PD6	61
33	AVSS	GND	GND	GND		PD5	60

34PIN INFORMATION

*1 PINS 1~7,9,10,12,15~17,19,21,22,27,30,32,33
THESE PINS ARE INTERNALLY PULLED-UP AT ABOUT +5V,THEREFORE.
USER'S REMOTE CONTROLLER CIRCUITS FOR *2 PINS SHOULD BE DESIGNED OPEN COLLECTOR OUTPUT CIRCUIT OR TRANSISTOR LOGIC (TTL) LEVEL (L:LESS THAN 0.8V,H:2.4V~5V) AS SHOWN BELOW.

*2 PINS 8,11,14,20,23~26,29,30
THESE SIGNALS OUTPUT BY OPEN COLLECTOR CIRCUIT

*3 PIN 34
DON'T USE THIS +12V FOR OTHER EQUIPMENT EXCEPT OUR REMOTE CONTROLLER AND EDITING REMOTE CONTROLLER

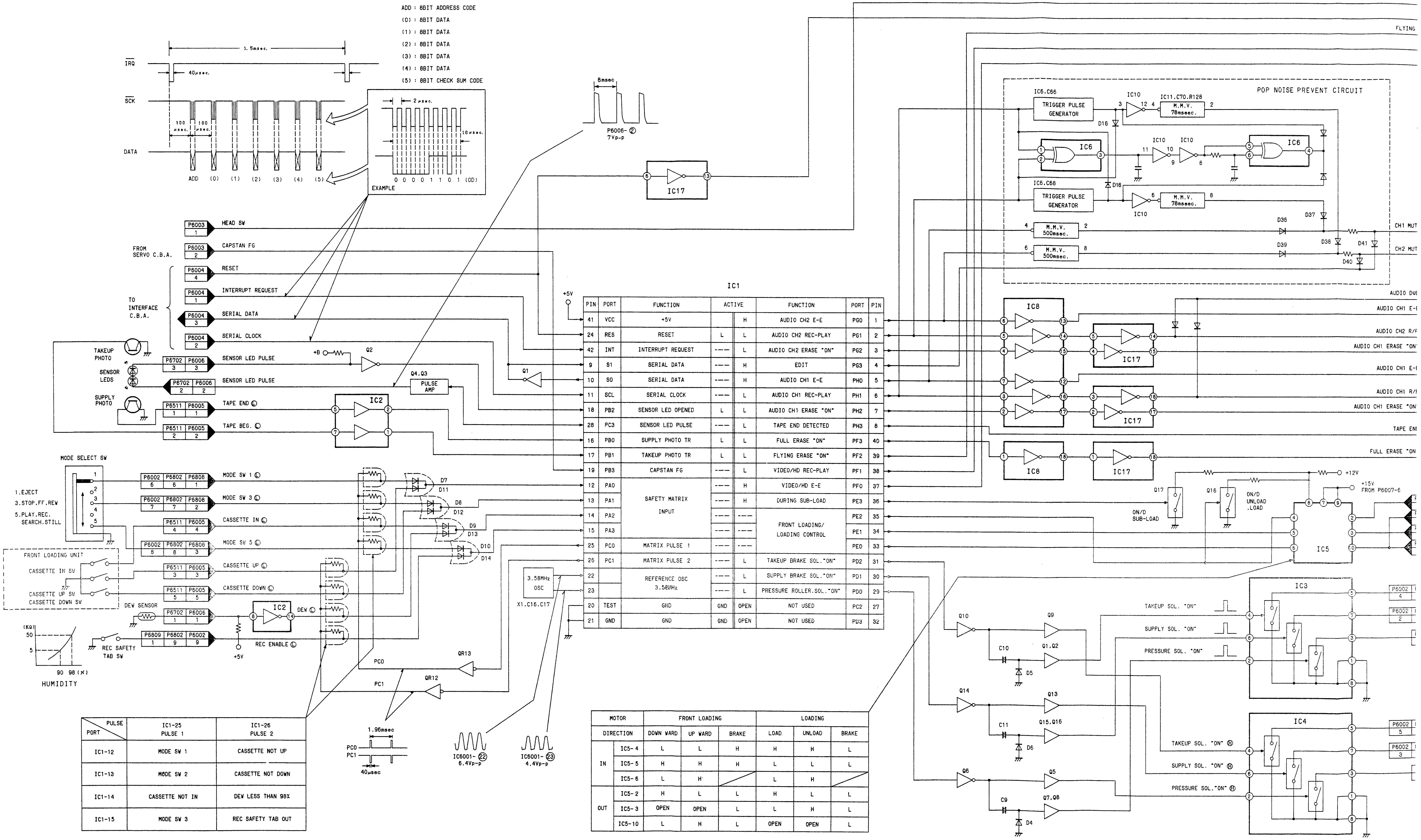
+5V
10K
REMOTE CONTROLLER
OPEN COLLECTOR OUTPUT
OR
TTL LEVEL
+E REMOTE CONTROLLER
PULL-UP RESISTOR
OUTPUT
MAX 16mA
THIS VOLTAGE SHOULD BE BETWEEN 3-30 VOLTS

* REMOTE SEARCH CONTROL SIGNALS

MODE / PIN NO.	REVERSE								FORWARD							
	×10	×5	×2	×1	×1/2	×1/5	×1/10	×1/25	×1/25	×1/10	×1/5	×1/2	×1	×2	×5	×10
REMOTE 19 IC6201-3	L	–	L	H	L	H	L	H	H	L	H	L	H	L	H	L
REMOTE 30 IC6201-54	H	H	H	H	L	L	L	L	L	L	L	L	H	H	H	H
REMOTE 33 IC6201-53	L	L	H	H	H	H	L	L	L	L	H	H	H	H	L	L
FWD/REV IC6201-14	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H

L: LOW. STATUS H: HIGH. STATUS

SYSTEM CONTROL (1) BLOCK DIAGRAM


ADD : 8BIT ADDRESS CODE
(0) : 8BIT DATA
(1) : 8BIT DATA
(2) : 8BIT DATA
(3) : 8BIT DATA
(4) : 8BIT DATA
(5) : 8BIT CHECK SUM CODE
IRQ
SCK
DATA
1.5msec.
40μsec.
100 μsec.
100 μsec.
ADD (0) (1) (2) (3) (4) (5)
2μsec.
16μsec.
0 0 0 0 1 1 0 1 (0D)
EXAMPLE
8msec
P6006-②
7Vp-p
IC17
P6003 1 HEAD SW
FROM SERVO C.B.A.
P6003 2 CAPSTAN FG
P6004 4 RESET
TO INTERFACE C.B.A.
P6004 1 INTERRUPT REQUEST
P6004 3 SERIAL DATA
P6004 2 SERIAL CLOCK
TAKEUP PHOTO
SENSOR LEDS
SUPPLY PHOTO
P6702 P6006 3 3 SENSOR LED PULSE
P6702 P6006 2 2 SENSOR LED PULSE
P6511 P6005 1 1 TAPE END Ⓛ
P6511 P6005 2 2 TAPE BEG. Ⓛ
+B Q2
Q4.Q3 PULSE AMP
Q1
IC2
MODE SELECT SW
1.EJECT
3.STOP.FF.REW
5.PLAY.REC. SEARCH.STILL
P6002 P6802 P6808 5 6 1 MODE SW 1 Ⓛ
P6002 P6802 P6808 7 7 2 MODE SW 3 Ⓛ
P6511 P6005 4 4 CASSETTE IN Ⓛ
P6002 P6802 P6808 8 8 3 MODE SW 5 Ⓛ
FRONT LOADING UNIT
CASSETTE IN SW
CASSETTE UP SW
CASSETTE DOWN SW
P6511 P6005 3 3 CASSETTE UP Ⓛ
P6511 P6005 5 5 CASSETTE DOWN Ⓛ
DEW SENSOR
P6702 P6006 1 1
IC2 DEW Ⓗ
P6809 P6802 P6002 1 9 9
REC SAFETY TAB SW
REC ENABLE Ⓛ
+5V
(KΩ) 50 5
90 98 (%)
HUMIDITY
D7 D11 D8 D12 D9 D13 D10 D14
PC0 QR13
PC1 QR12
1.96msec
40μsec
IC6001-㉒ 6.4Vp-p
IC6001-㉓ 4.4Vp-p
3.58MHz OSC
X1.C16.C17
+5V
IC1
FLYING
POP NOISE PREVENT CIRCUIT
IC6.C66 TRIGGER PULSE GENERATOR
IC10
IC11.C70.R128 M.M.V. 78msec.
IC6
IC6.C68 TRIGGER PULSE GENERATOR
M.M.V. 78msec.
M.M.V. 500msec.
M.M.V. 500msec.
D16 D36 D37 D38 D39 D40 D41
CH1 MUT
CH2 MUT
AUDIO DU
AUDIO CH1 E-
AUDIO CH2 R/
AUDIO CH1 ERASE "ON
AUDIO CH1 E-
AUDIO CH1 R/
AUDIO CH1 ERASE "ON
TAPE EN
FULL ERASE "ON
IC8
IC17
+12V
+15V FROM P6007-6
Q17 ON/D SUB-LOAD
Q16 ON/D UNLOAD .LOAD
IC5
IC3
TAKEUP SOL. "ON"
SUPPLY SOL. "ON"
PRESSURE SOL. "ON"
Q10 Q9 C10 Q1.Q2 D5
Q14 Q13 C11 Q15.Q16 D6
Q6 Q5 C9 Q7.Q8 D4
IC4
TAKEUP SOL. "ON" Ⓗ
SUPPLY SOL. "ON" Ⓗ
PRESSURE SOL. "ON" Ⓗ
P6002 4
P6002 2
P6002 5
P6002 3

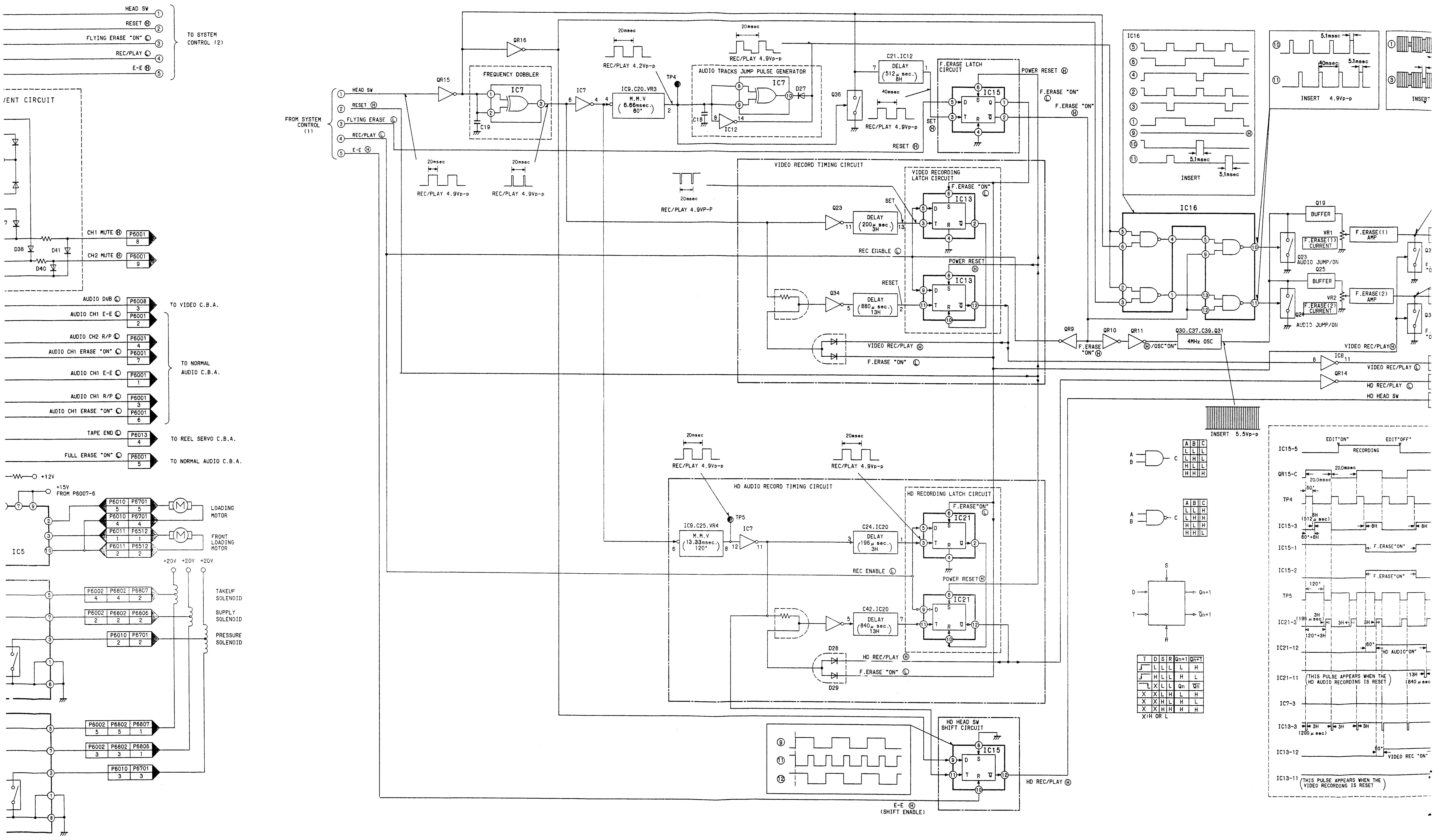
IC1

PIN	PORT	FUNCTION	ACTIVE	ACTIVE	FUNCTION	PORT	PIN
41	VCC	+5V		H	AUDIO CH2 E-E	PG0	1
24	RES	RESET	L	L	AUDIO CH2 REC-PLAY	PG1	2
42	INT	INTERRUPT REQUEST	---	L	AUDIO CH2 ERASE "ON"	PG2	3
9	S1	SERIAL DATA	---	H	EDIT	PG3	4
10	S0	SERIAL DATA	---	H	AUDIO CH1 E-E	PH0	5
11	SCL	SERIAL CLOCK	---	L	AUDIO CH1 REC-PLAY	PH1	6
18	PB2	SENSOR LED OPENED	L	L	AUDIO CH1 ERASE "ON"	PH2	7
28	PC3	SENSOR LED PULSE	---	L	TAPE END DETECTED	PH3	8
16	PB0	SUPPLY PHOTO TR	L	L	FULL ERASE "ON"	PF3	40
17	PB1	TAKEUP PHOTO TR	L	L	FLYING ERASE "ON"	PF2	39
19	PB3	CAPSTAN FG	---	L	VIDEO/HD REC-PLAY	PF1	38
12	PA0	SAFETY MATRIX INPUT	---	H	VIDEO/HD E-E	PF0	37
13	PA1		---	H	DURING SUB-LOAD	PE3	36
14	PA2		---	---	FRONT LOADING/ LOADING CONTROL	PE2	35
15	PA3		---	---		PE1	34
25	PC0	MATRIX PULSE 1	---	---		PE0	33
26	PC1	MATRIX PULSE 2	---	L	TAKEUP BRAKE SOL."ON"	PD2	31
22		REFERENCE OSC 3.58MHz	---	L	SUPPLY BRAKE SOL."ON"	PD1	30
23			---	L	PRESSURE ROLLER.SOL."ON"	PD0	29
20	TEST	GND	GND	OPEN	NOT USED	PC2	27
21	GND	GND	GND	OPEN	NOT USED	PD3	32

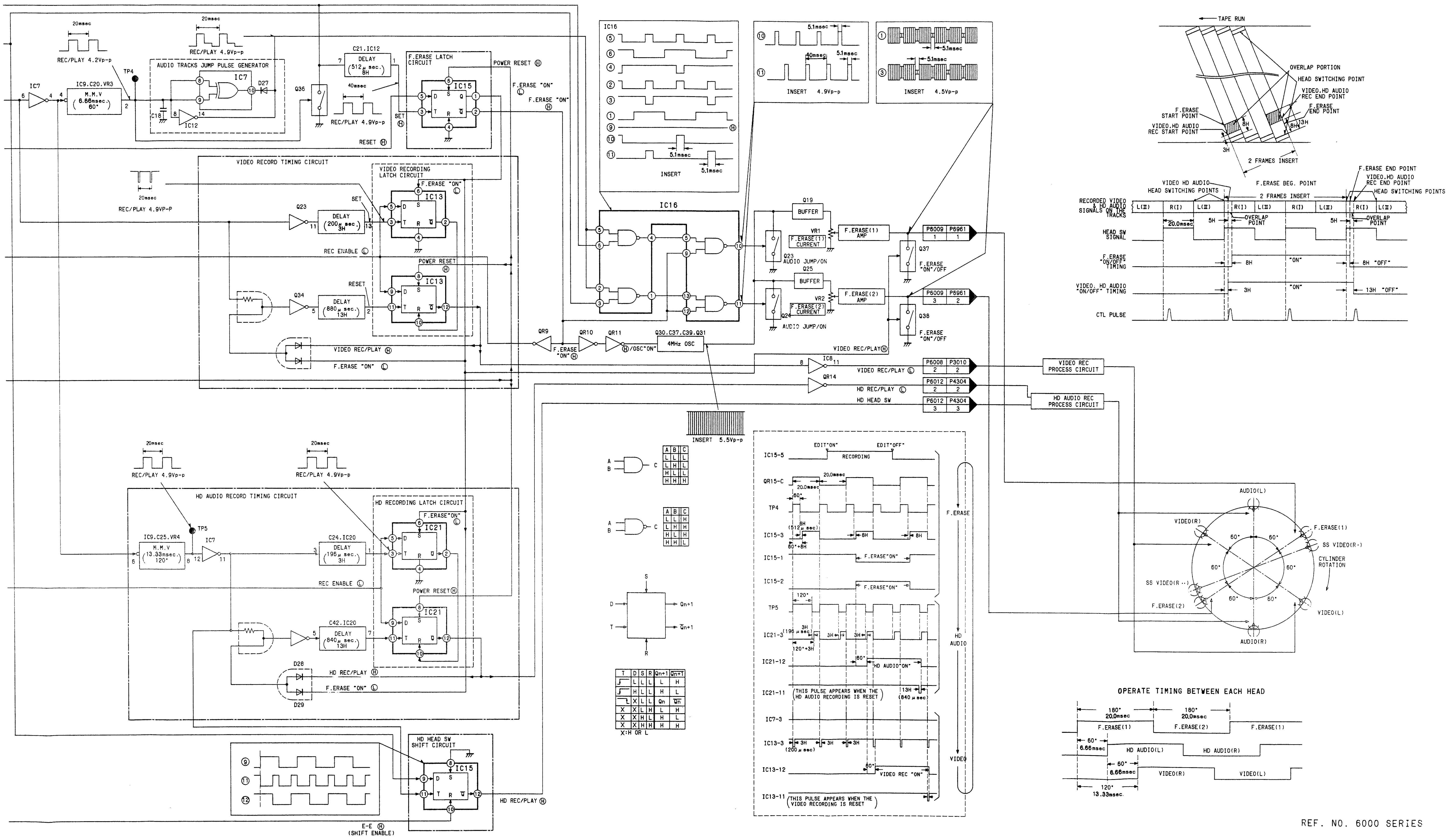
PULSE / PORT	IC1-25 PULSE 1	IC1-26 PULSE 2
IC1-12	MODE SW 1	CASSETTE NOT UP
IC1-13	MODE SW 2	CASSETTE NOT DOWN
IC1-14	CASSETTE NOT IN	DEW LESS THAN 98%
IC1-15	MODE SW 3	REC SAFETY TAB OUT

MOTOR		FRONT LOADING			LOADING		
DIRECTION		DOWN WARD	UP WARD	BRAKE	LOAD	UNLOAD	BRAKE
IN	IC5-4	L	L	H	H	H	L
	IC5-5	H	H	H	L	L	L
	IC5-6	L	H		L	H	
OUT	IC5-2	H	L	L	H	L	L
	IC5-3	OPEN	OPEN	L	L	H	L
	IC5-10	L	H	L	OPEN	OPEN	L

SYSTEM CONTROL (2) BLOCK DIAGRAM


HEAD SW ①
RESET Ⓗ ②
FLYING ERASE "ON" Ⓛ ③
REC/PLAY Ⓛ ④
E-E Ⓗ ⑤
TO SYSTEM CONTROL (2)
FROM SYSTEM CONTROL (1)
QR15
QR16
FREQUENCY DOBBLER
IC7
C19
IC9.C20.VR3 M.M.V (6.66msec. 60°)
TP4
AUDIO TRACKS JUMP PULSE GENERATOR
IC12
C18
D27
Q36
C21.IC12 DELAY (512μ sec. 8H)
F.ERASE LATCH CIRCUIT
IC15
POWER RESET Ⓗ
F.ERASE "ON" Ⓛ
F.ERASE "ON" Ⓗ
RESET Ⓗ
SET Ⓗ
20msec
REC/PLAY 4.2Vp-p
REC/PLAY 4.9Vp-p
40msec
VIDEO RECORD TIMING CIRCUIT
VIDEO RECORDING LATCH CIRCUIT
IC13
Q23
DELAY (200μ sec. 3H)
Q34
DELAY (880μ sec. 13H)
REC ENABLE Ⓛ
VIDEO REC/PLAY Ⓗ
F.ERASE "ON" Ⓛ
IC16
INSERT
5.1msec
INSERT 4.9Vp-p
Q19 BUFFER
VR1 F.ERASE(1) CURRENT
F.ERASE(1) AMP
Q23 AUDIO JUMP/ON
Q25 BUFFER
VR2 F.ERASE(2) CURRENT
F.ERASE(2) AMP
Q24 AUDIO JUMP/ON
QR9 QR10 QR11
F.ERASE "ON" Ⓗ
/OSC "ON"
Q30.C37.C39.Q31 4MHz OSC
IC8
QR14
VIDEO REC/PLAY Ⓗ
VIDEO REC/PLAY Ⓛ
HD REC/PLAY Ⓛ
HD HEAD SW
INSERT 5.5Vp-p
HD AUDIO RECORD TIMING CIRCUIT
HD RECORDING LATCH CIRCUIT
IC9.C25.VR4 M.M.V (13.33msec. 120°)
TP5
C24.IC20 DELAY (196μ sec. 3H)
C42.IC20 DELAY (840μ sec. 13H)
IC21
D28 D29
HD REC/PLAY Ⓗ
HD HEAD SW SHIFT CIRCUIT
E-E Ⓗ (SHIFT ENABLE)
CH1 MUTE Ⓗ P6001 8
CH2 MUTE Ⓗ P6001 9
D38 D40 D41
AUDIO DUB Ⓛ P6008 3
AUDIO CH1 E-E Ⓛ P6001 2
AUDIO CH2 R/P Ⓛ P6001 4
AUDIO CH1 ERASE "ON" Ⓛ P6001 7
AUDIO CH1 E-E Ⓛ P6001 1
AUDIO CH1 R/P Ⓛ P6001 3
AUDIO CH1 ERASE "ON" Ⓛ P6001 6
TO VIDEO C.B.A.
TO NORMAL AUDIO C.B.A.
TAPE END Ⓛ P6013 4
TO REEL SERVO C.B.A.
FULL ERASE "ON" Ⓛ P6001 5
TO NORMAL AUDIO C.B.A.
+12V
+15V FROM P6007-6
IC5
LOADING MOTOR
FRONT LOADING MOTOR
TAKEUP SOLENOID
SUPPLY SOLENOID
PRESSURE SOLENOID
+20V
EDIT "ON" EDIT "OFF" RECORDING
IC15-5 QR15-C TP4 IC15-3 IC15-1 IC15-2 TP5 IC21-3 IC21-12 IC21-11 IC7-3 IC13-3 IC13-12 IC13-11
THIS PULSE APPEARS WHEN THE HD AUDIO RECORDING IS RESET
THIS PULSE APPEARS WHEN THE VIDEO RECORDING IS RESET
F.ERASE "ON"
HD AUDIO "ON"
VIDEO REC "ON"
X:H OR L

CK DIAGRAM


REC/PLAY 4.2Vp-p
20msec
REC/PLAY 4.9Vp-p
AUDIO TRACKS JUMP PULSE GENERATOR
TP4
IC7
IC9.C20.VR3
M.M.V
6.66msec
60°
IC12
C18
D27
Q36
C21.IC12
DELAY
512μ sec.
8H
40msec
F.ERASE LATCH CIRCUIT
IC15
POWER RESET Ⓗ
F.ERASE "ON" Ⓛ
F.ERASE "ON" Ⓗ
SET Ⓗ
RESET Ⓗ
VIDEO RECORD TIMING CIRCUIT
VIDEO RECORDING LATCH CIRCUIT
IC13
REC/PLAY 4.9VP-P
Q23
DELAY
200μ sec.
3H
REC ENABLE Ⓛ
POWER RESET Ⓗ
Q34
DELAY
880μ sec.
13H
VIDEO REC/PLAY Ⓗ
F.ERASE "ON" Ⓛ
QR9
QR10
QR11
Q30.C37.C39.Q31
4MHz OSC
Ⓗ/OSC"ON"
F.ERASE "ON" Ⓗ
IC16
INSERT
5.1msec
INSERT 4.9Vp-p
INSERT 4.5Vp-p
40msec
Q19
BUFFER
VR1
F.ERASE(1) CURRENT
F.ERASE(1) AMP
Q23 AUDIO JUMP/ON
Q25
BUFFER
VR2
F.ERASE(2) CURRENT
F.ERASE(2) AMP
Q24 AUDIO JUMP/ON
Q37
F.ERASE "ON"/OFF
Q38
F.ERASE "ON"/OFF
P6009 P5961
VIDEO REC/PLAYⒽ
IC8
QR14
VIDEO REC/PLAY Ⓛ
HD REC/PLAY Ⓛ
HD HEAD SW
P6008 P3010
P6012 P4304
VIDEO REC PROCESS CIRCUIT
HD AUDIO REC PROCESS CIRCUIT
INSERT 5.5Vp-p
HD AUDIO RECORD TIMING CIRCUIT
TP5
IC9.C25.VR4
M.M.V
13.33msec.
120°
C24.IC20
DELAY
196μ sec.
3H
REC ENABLE Ⓛ
HD RECORDING LATCH CIRCUIT
F.ERASE"ON" Ⓛ
IC21
POWER RESETⒽ
C42.IC20
DELAY
840μ sec.
13H
D28
D29
HD REC/PLAY Ⓗ
F.ERASE "ON" Ⓛ
HD HEAD SW SHIFT CIRCUIT
HD REC/PLAY Ⓗ
E-E Ⓗ
(SHIFT ENABLE)
TAPE RUN
OVERLAP PORTION
HEAD SWITCHING POINT
VIDEO.HD AUDIO REC END POINT
F.ERASE END POINT
F.ERASE START POINT
VIDEO.HD AUDIO REC START POINT
8H
13H
3H
2 FRAMES INSERT
VIDEO HD AUDIO HEAD SWITCHING POINTS
F.ERASE BEG. POINT
F.ERASE END POINT
VIDEO.HD AUDIO REC END POINT
HEAD SWITCHING POINTS
RECORDED VIDEO & HD AUDIO SIGNALS ON THE TRACKS
L(Ⅱ) R(Ⅰ) L(Ⅱ) R(Ⅰ) R(Ⅰ) L(Ⅱ) R(Ⅰ) L(Ⅱ)
HEAD SW SIGNAL
20.0msec
5H
OVERLAP POINT
F.ERASE "ON/OFF" TIMING
8H "ON" 8H "OFF"
VIDEO. HD AUDIO "ON/OFF" TIMING
3H "ON" 13H "OFF"
CTL PULSE
EDIT"ON" EDIT"OFF"
RECORDING
IC15-5
QR15-C
TP4
IC15-3
IC15-1
IC15-2
TP5
IC21-3
IC21-12
IC21-11
IC7-3
IC13-3
IC13-12
IC13-11
F.ERASE"ON"
HD AUDIO"ON"
THIS PULSE APPEARS WHEN THE HD AUDIO RECORDING IS RESET
VIDEO REC "ON"
THIS PULSE APPEARS WHEN THE VIDEO RECORDING IS RESET
F.ERASE
HD AUDIO
VIDEO
AUDIO(L)
VIDEO(R)
F.ERASE(1)
SS VIDEO(R-)
CYLINDER ROTATION
SS VIDEO(R-)
F.ERASE(2)
VIDEO(L)
AUDIO(R)
60°

A	B	C
L	L	L
L	H	L
H	L	L
H	H	H

A	B	C
L	L	H
L	H	H
H	L	H
H	H	L

T	D	S	R	Qn+1	$\overline{Qn+1}$
⎍	L	L	L	L	H
⎍	H	L	L	H	L
⎍	X	L	L	Qn	$\overline{Qn}$
X	X	L	H	L	H
X	X	H	L	H	L
X	X	H	H	H	H

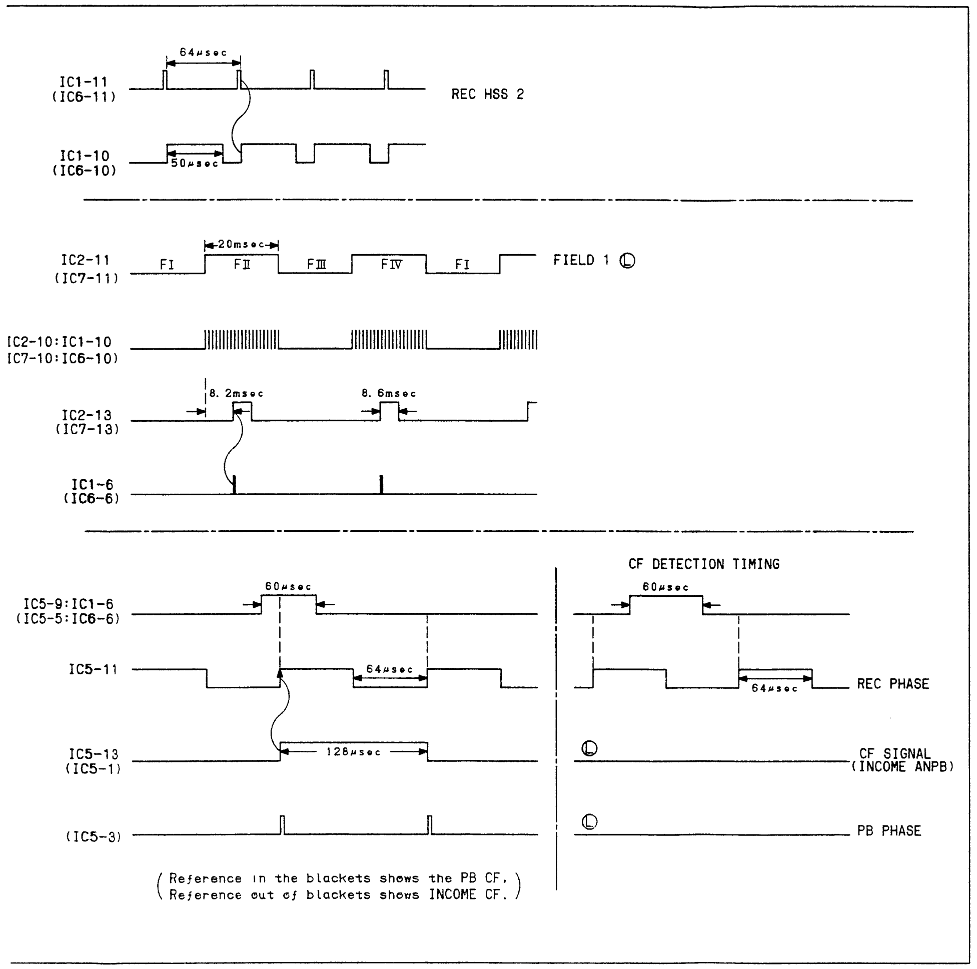
X:H OR L

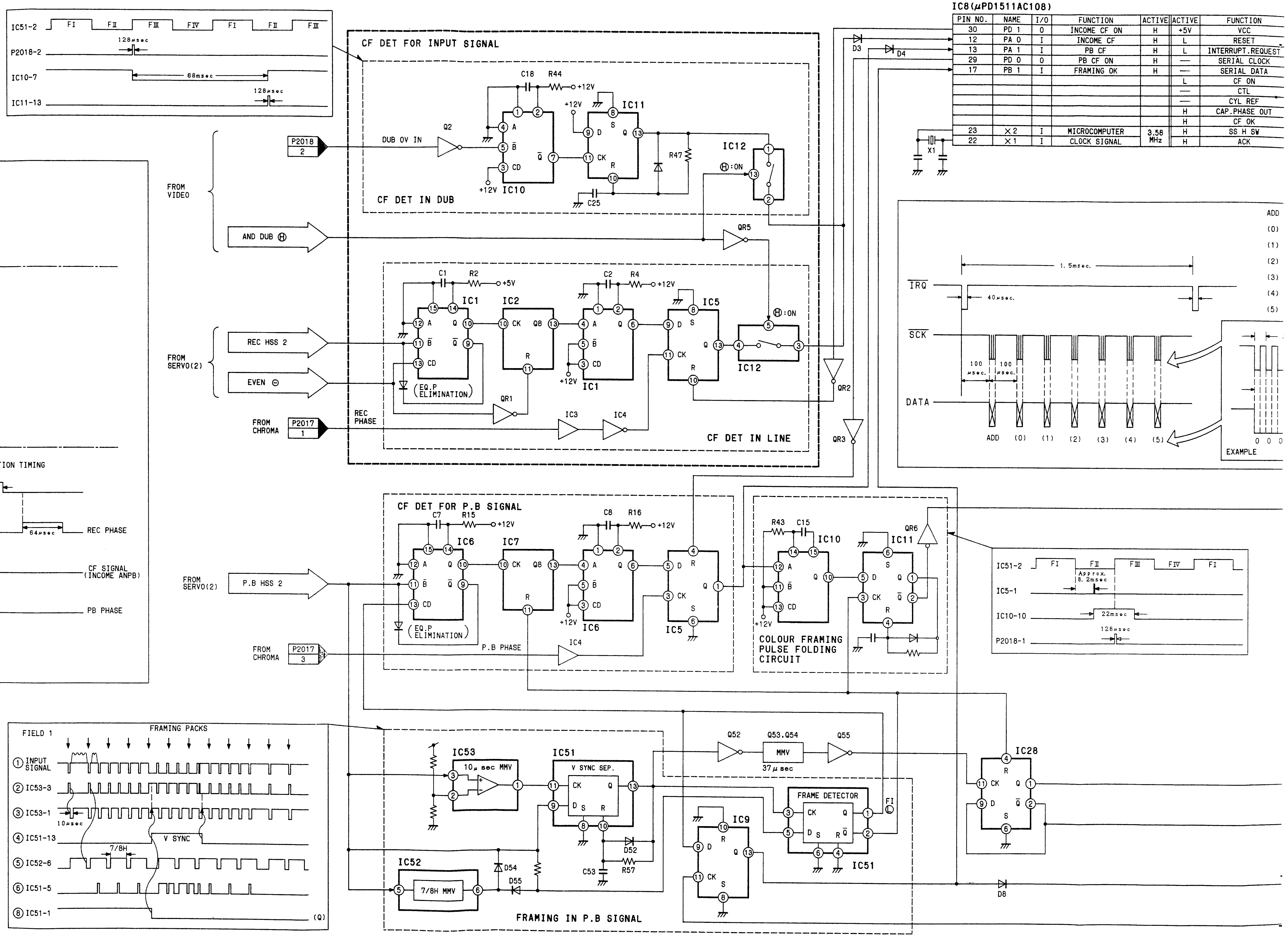
OPERATE TIMING BETWEEN EACH HEAD

180° 20.0msec
F.ERASE(1) F.ERASE(2) F.ERASE(1)
60° 6.66msec HD AUDIO(L) HD AUDIO(R)
60° 6.66msec VIDEO(R) VIDEO(L)
120° 13.33msec.

REF. NO. 6000 SERIES

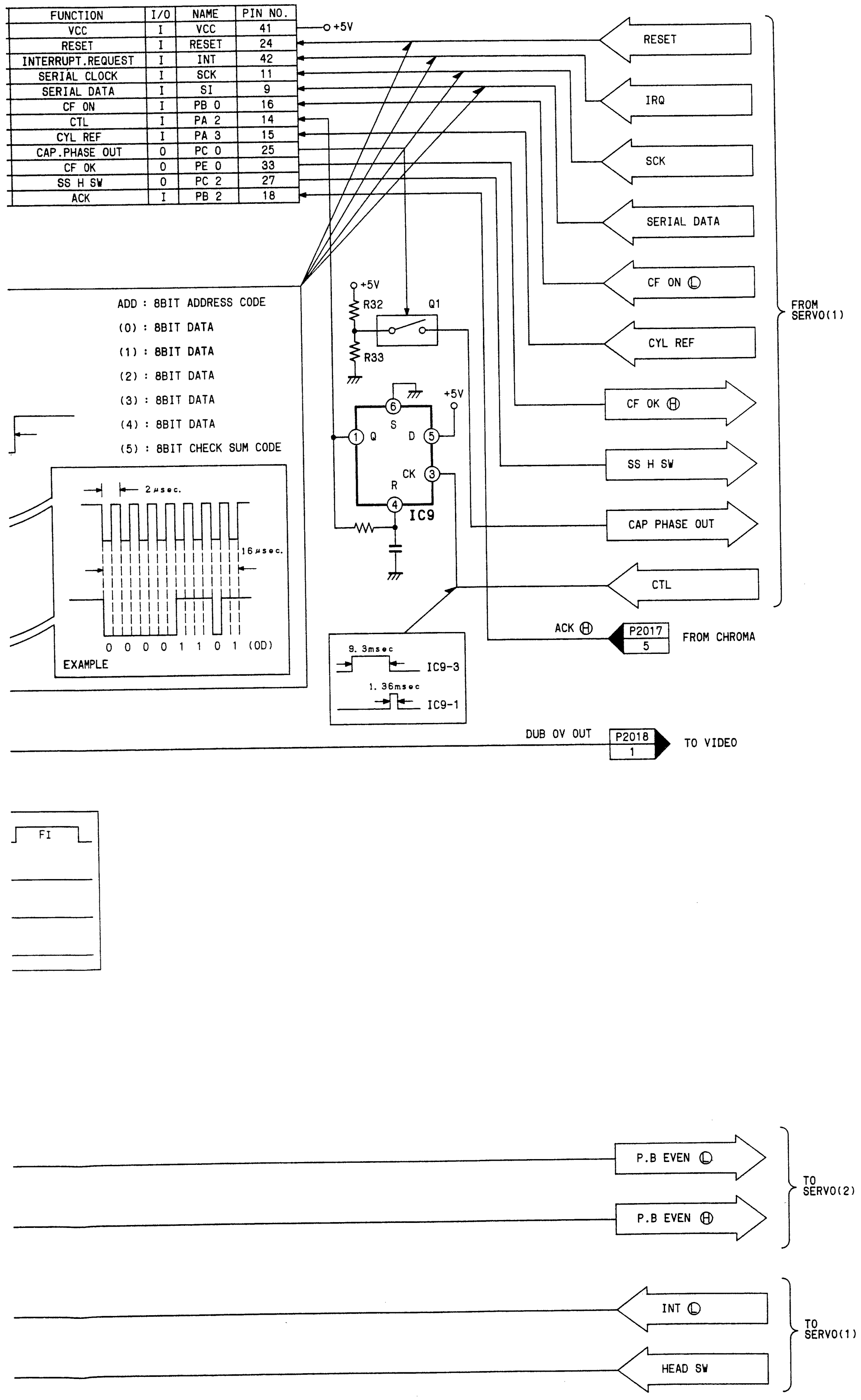
OLOUR FRAMING BLOCK DIAGRAM




IC51-2
P2018-2
IC10-7
IC11-13
128μsec
68msec
CF DET FOR INPUT SIGNAL
C18
R44
+12V
IC11
Q2
DUB OV IN
P2018
2
FROM VIDEO
IC12
Ⓗ:ON
R47
C25
+12V IC10
CF DET IN DUB
AND DUB Ⓗ
QR5
D3
D4
C1
R2
+5V
IC1
IC2
C2
R4
IC5
CK
QB
EQ.P ELIMINATION
QR1
FROM SERVO(2)
REC HSS 2
EVEN ⊖
FROM CHROMA
P2017
1
REC PHASE
IC3
IC4
CF DET IN LINE
QR2
QR3
CF DET FOR P.B SIGNAL
C7
R15
C8
R16
IC6
IC7
P.B HSS 2
P.B PHASE
P2017
3
R43
C15
IC10
IC11
QR6
COLOUR FRAMING PULSE FOLDING CIRCUIT
IC51-2
IC5-1
IC10-10
P2018-1
Approx. 8.2msec
22msec
126μsec
IRQ
SCK
DATA
1.5msec.
40μsec.
100 μsec.
ADD (0) (1) (2) (3) (4) (5)
EXAMPLE
X1
FIELD 1
FRAMING PACKS
① INPUT SIGNAL
② IC53-3
③ IC53-1
④ IC51-13
⑤ IC52-6
⑥ IC51-5
⑧ IC51-1
10μsec
7/8H
V SYNC
IC53
10μ sec MMV
IC51
V SYNC SEP.
Q52
Q53,Q54
Q55
MMV
37μ sec
FRAME DETECTOR
FI Ⓛ
IC9
IC52
7/8H MMV
D52
D54
D55
C53
R57
FRAMING IN P.B SIGNAL
IC28
D8

IC8(μPD1511AC108)

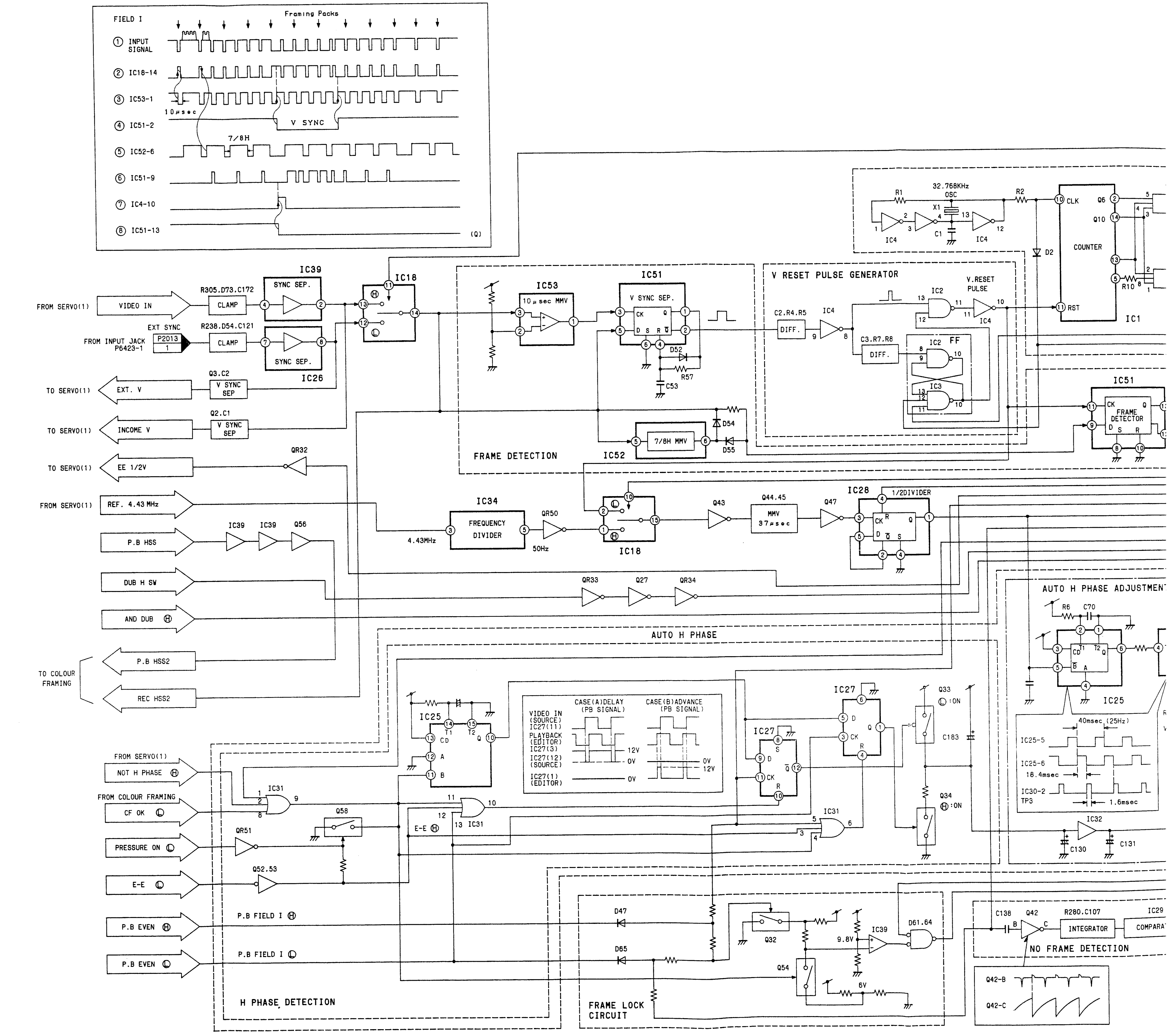
PIN NO.	NAME	I/O	FUNCTION	ACTIVE	ACTIVE	FUNCTION
30	PD 1	O	INCOME CF ON	H	+5V	VCC
12	PA 0	I	INCOME CF	H	L	RESET
13	PA 1	I	PB CF	H	L	INTERRUPT.REQUEST
29	PD 0	O	PB CF ON	H	—	SERIAL CLOCK
17	PB 1	I	FRAMING OK	H	—	SERIAL DATA
					L	CF ON
					—	CTL
					—	CYL REF
					H	CAP.PHASE OUT
					H	CF OK
23	×2	I	MICROCOMPUTER	3.58 MHz	H	SS H SW
22	×1	I	CLOCK SIGNAL		H	ACK



FUNCTION	I/O	NAME	PIN NO.
VCC	I	VCC	41
RESET	I	RESET	24
INTERRUPT.REQUEST	I	INT	42
SERIAL CLOCK	I	SCK	11
SERIAL DATA	I	SI	9
CF ON	I	PB 0	16
CTL	I	PA 2	14
CYL REF	I	PA 3	15
CAP.PHASE OUT	0	PC 0	25
CF OK	0	PE 0	33
SS H SW	0	PC 2	27
ACK	I	PB 2	18

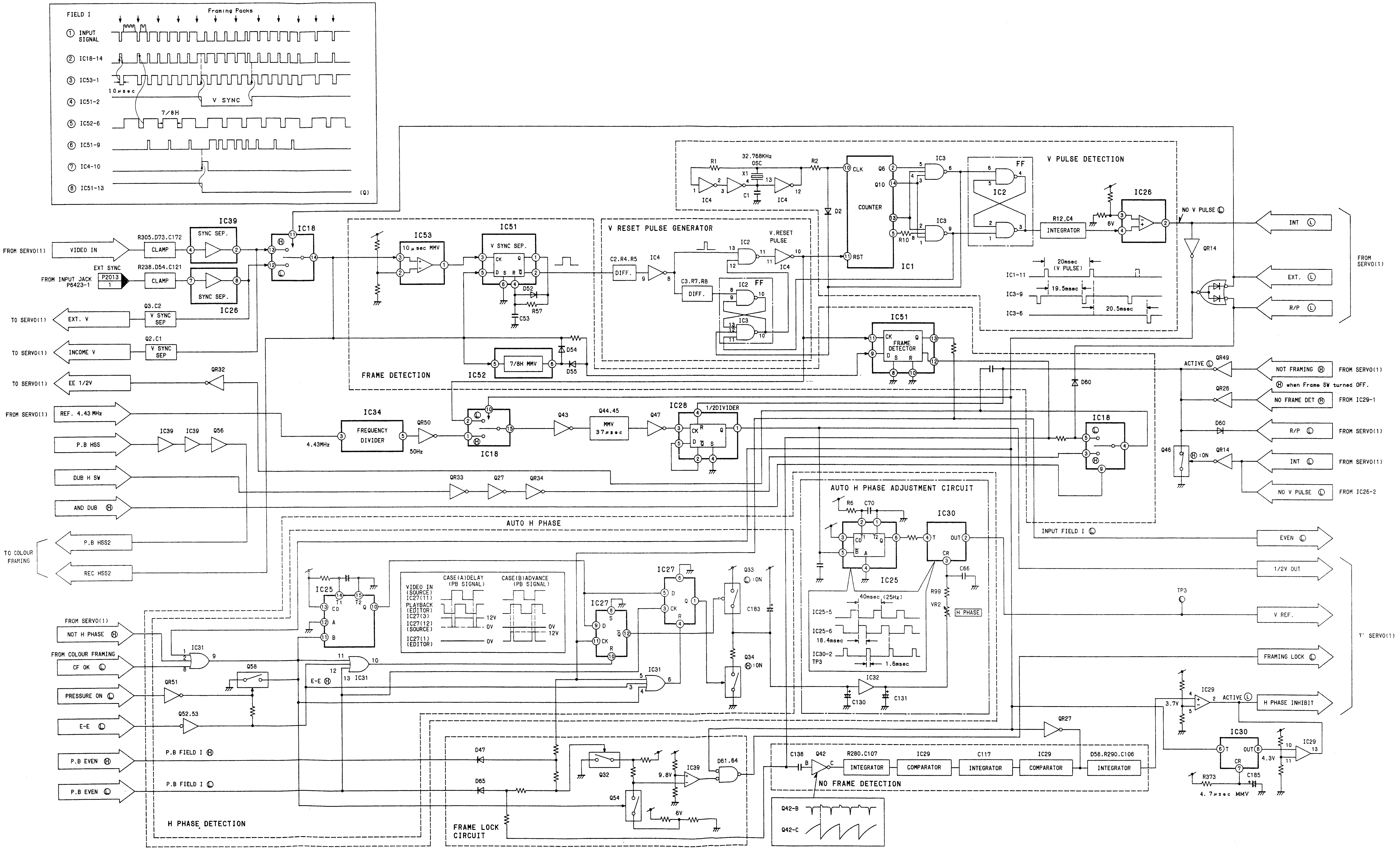
+5V
RESET
IRQ
SCK
SERIAL DATA
CF ON Ⓛ
CYL REF
CF OK Ⓗ
SS H SW
CAP PHASE OUT
CTL
FROM SERVO(1)
ADD : 8BIT ADDRESS CODE
(0) : 8BIT DATA
(1) : 8BIT DATA
(2) : 8BIT DATA
(3) : 8BIT DATA
(4) : 8BIT DATA
(5) : 8BIT CHECK SUM CODE
2μsec.
16μsec.
0 0 0 0 1 1 0 1 (0D)
EXAMPLE
+5V
R32
R33
Q1
+5V
S
D
Q
CK
R
IC9
9. 3msec
IC9-3
1. 36msec
IC9-1
ACK Ⓗ
P2017
5
FROM CHROMA
DUB OV OUT
P2018
1
TO VIDEO
FI
P.B EVEN Ⓛ
P.B EVEN Ⓗ
TO SERVO(2)
INT Ⓛ
HEAD SW
TO SERVO(1)

SERVO (2) BLOCK DIAGRAM

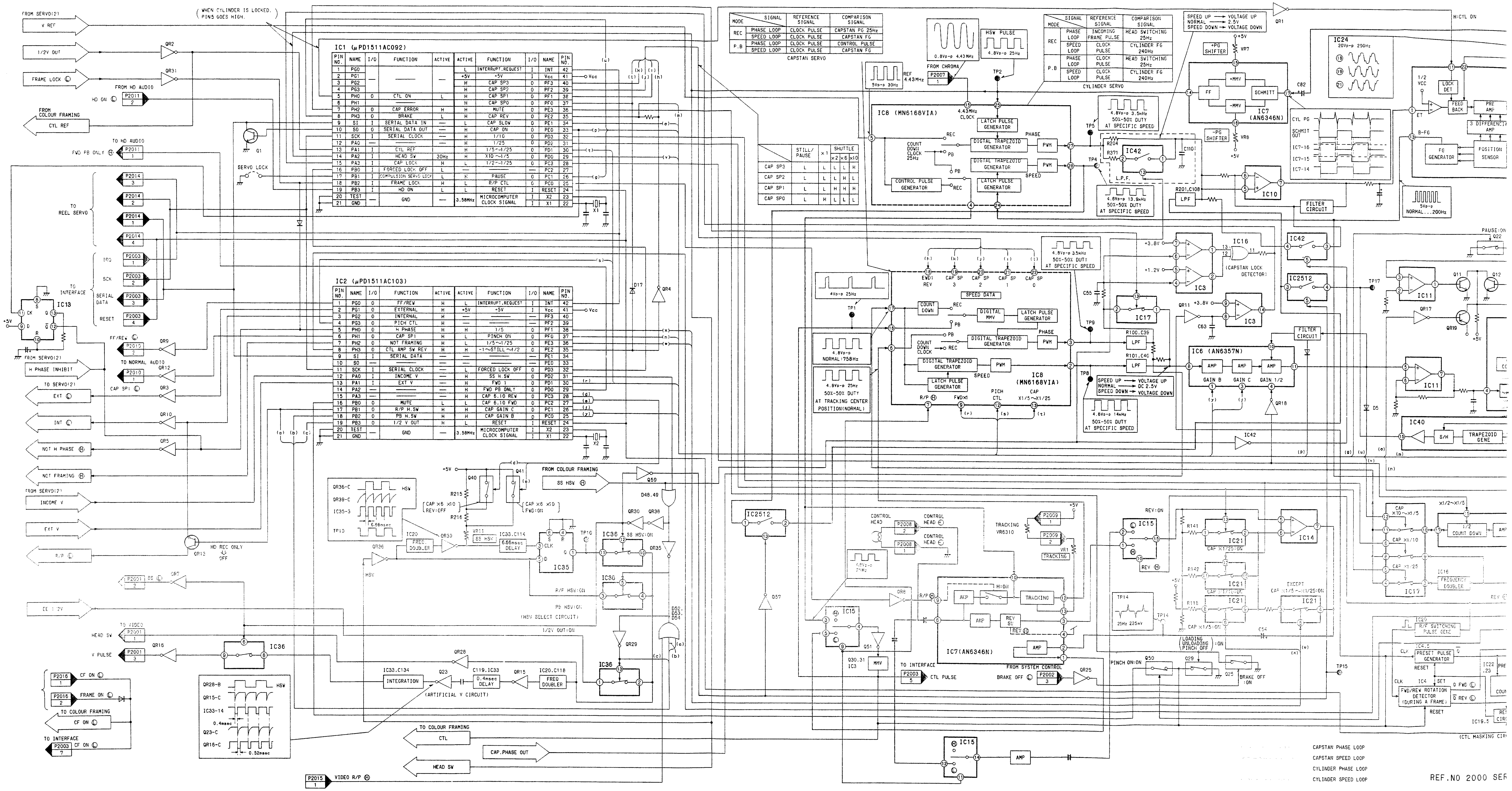


FIELD I
Framing Packs
① INPUT SIGNAL
② IC18-14
③ IC53-1
10μsec
④ IC51-2
V SYNC
7/8H
⑤ IC52-6
⑥ IC51-9
⑦ IC4-10
⑧ IC51-13
(Q)
FROM SERVO(1)
VIDEO IN
R305.D73.C172
CLAMP
SYNC SEP.
IC39
EXT SYNC
R238.D54.C121
FROM INPUT JACK P6423-1
P2013
1
CLAMP
SYNC SEP.
IC26
IC18
TO SERVO(1)
EXT. V
Q3.C2
V SYNC SEP
TO SERVO(1)
INCOME V
Q2.C1
V SYNC SEP
TO SERVO(1)
EE 1/2V
QR32
FROM SERVO(1)
REF. 4.43MHz
P.B HSS
IC39
IC39
Q56
DUB H SW
AND DUB Ⓗ
TO COLOUR FRAMING
P.B HSS2
REC HSS2
IC53
10μsec MMV
IC51
V SYNC SEP.
CK Q
D S R Q̄
D52
R57
C53
FRAME DETECTION
IC52
7/8H MMV
D54
D55
V RESET PULSE GENERATOR
C2.R4.R5
DIFF.
IC4
IC2
V.RESET PULSE
IC4
C3.R7.R8
DIFF.
IC2 FF
IC3
R1
32.768KHz OSC
X1
C1
IC4
IC4
R2
D2
CLK
Q6
Q10
COUNTER
RST
IC1
R10
IC51
CK Q
FRAME DETECTOR
D S R
IC34
FREQUENCY DIVIDER
4.43MHz
QR50
50Hz
IC18
Q43
Q44.45
MMV
37μsec
Q47
IC28
1/2DIVIDER
CK R Q
D Q̄ S
QR33
Q27
QR34
AUTO H PHASE ADJUSTMENT
R6
C70
CD T1 T2 Q
B̄ A
IC25
40msec (25Hz)
IC25-5
IC25-6
18.4msec
IC30-2
TP3
1.6msec
IC32
C130
C131
AUTO H PHASE
IC25
T1 T2
CD Q
A
B
CASE(A)DELAY (PB SIGNAL)
CASE(B)ADVANCE (PB SIGNAL)
VIDEO IN (SOURCE) IC27(11)
PLAYBACK (EDITOR)
IC27(3)
IC27(12) (SOURCE)
IC27(1) (EDITOR)
12V
0V
0V
12V
0V
IC27
D Q
CK
R
IC27
S
D Q̄
CK
R
Q33
Ⓛ:ON
C183
Q34
Ⓗ:ON
FROM SERVO(1)
NOT H PHASE Ⓗ
FROM COLOUR FRAMING
CF OK Ⓛ
IC31
IC31
Q58
E-E Ⓗ
PRESSURE ON Ⓛ
QR51
Q52.53
E-E Ⓛ
P.B EVEN Ⓗ
P.B EVEN Ⓛ
P.B FIELD I Ⓗ
P.B FIELD I Ⓛ
H PHASE DETECTION
D47
D65
IC31
FRAME LOCK CIRCUIT
Q32
9.8V
IC39
D61.64
Q54
6V
C138
Q42
B
C
R280.C107
INTEGRATOR
IC29
COMPARAT
NO FRAME DETECTION
Q42-B
Q42-C

SERVO (2) BLOCK DIAGRAM


FIELD I
Framing Packs
① INPUT SIGNAL
② IC18-14
③ IC53-1
④ IC51-2
⑤ IC52-6
⑥ IC51-9
⑦ IC4-10
⑧ IC51-13
10μsec
V SYNC
7/8H
(Q)
FROM SERVO(1)
VIDEO IN
R305.D73.C172
CLAMP
SYNC SEP.
IC39
EXT SYNC
FROM INPUT JACK P6423-1
P2013
R238.D54.C121
IC26
TO SERVO(1)
EXT. V
Q3.C2
V SYNC SEP
INCOME V
Q2.C1
EE 1/2V
QR32
REF. 4.43 MHz
P.B HSS
DUB H SW
AND DUB Ⓗ
TO COLOUR FRAMING
P.B HSS2
REC HSS2
IC18
IC53
10μsec MMV
IC51
V SYNC SEP.
D52
R57
C53
7/8H MMV
IC52
D54
D55
FRAME DETECTION
V RESET PULSE GENERATOR
C2.R4.R5
DIFF.
IC4
IC2
V.RESET PULSE
C3.R7.R8
FF
IC3
R1
32.768KHz OSC
X1
C1
R2
D2
CLK
Q6
Q10
COUNTER
RST
IC1
R10
V PULSE DETECTION
R12.C4
INTEGRATOR
6V
NO V PULSE Ⓛ
QR14
20msec (V PULSE)
IC1-11
19.5msec
IC3-9
20.5msec
IC3-6
INT Ⓛ
EXT. Ⓛ
R/P Ⓛ
FROM SERVO(1)
FRAME DETECTOR
ACTIVE Ⓛ
QR49
NOT FRAMING Ⓗ
Ⓗ when Frame SW turned OFF.
QR26
NO FRAME DET Ⓗ
FROM IC29-1
D60
Q46
Ⓗ:ON
NO V PULSE Ⓛ
FROM IC26-2
IC34
FREQUENCY DIVIDER
4.43MHz
QR50
50Hz
Q43
Q44.45
MMV 37μsec
Q47
IC28
1/2DIVIDER
IC39
Q56
QR33
Q27
QR34
INPUT FIELD I Ⓛ
AUTO H PHASE
AUTO H PHASE ADJUSTMENT CIRCUIT
R6
C70
IC30
IC25
C66
R99
VR2
H PHASE
40msec (25Hz)
IC25-5
IC25-6
18.4msec
IC30-2 TP3
1.6msec
IC32
C130
C131
EVEN
1/2V OUT
TP3
V REF.
TO SERVO(1)
FRAMING LOCK Ⓛ
H PHASE INHIBIT
IC29
3.7V
4.3V
R373
C185
4.7μsec MMV
CASE(A)DELAY (PB SIGNAL)
CASE(B)ADVANCE (PB SIGNAL)
VIDEO IN (SOURCE) IC27(11)
PLAYBACK (EDITOR) IC27(3)
IC27(12) (SOURCE)
IC27(1) (EDITOR)
12V
0V
IC27
Q33 Ⓛ:ON
Q34 Ⓗ:ON
C183
FROM SERVO(1)
NOT H PHASE Ⓗ
FROM COLOUR FRAMING
CF OK Ⓛ
PRESSURE ON Ⓛ
E-E Ⓛ
P.B EVEN Ⓗ
P.B EVEN Ⓛ
IC31
QR51
Q58
Q52.53
E-E Ⓗ
P.B FIELD I Ⓗ
P.B FIELD I Ⓛ
D47
D65
Q32
Q54
9.8V
IC39
D61.64
QR27
C138
Q42
R280.C107
INTEGRATOR
COMPARATOR
C117
D58.R290.C106
NO FRAME DETECTION
Q42-B
Q42-C
H PHASE DETECTION
FRAME LOCK CIRCUIT

SERVO (1) BLOCK DIAGRAM


FROM SERVO(2)
V REF
1/2V OUT
FRAME LOCK
QR2
QR31
FROM HD AUDIO
HD ON
P2011
FROM COLOUR FRAMING
CYL REF
TO HD AUDIO
FWD PB ONLY
Q1
SERVO LOCK
(WHEN CYLINDER IS LOCKED, PINS GOES HIGH.)
TO REEL SERVO
P2014
TO INTERFACE
IRQ
SCK
SERIAL DATA
RESET
P2003
IC13
+5V
FROM SERVO(2)
H PHASE INHIBIT
FF/REW
QR9
TO NORMAL AUDIO
QR12
CAP SP1
TO SERVO(2)
EXT
INT
NOT H PHASE
NOT FRAMING
INCOME V
EXT V
R/P
QR3
QR10
QR5
QR13
HD REC ONLY
SS HSW
FROM COLOUR FRAMING
Q40
Q41
R215
R216
CAP ×6 ×10 REV:OFF
CAP ×6 ×10 FWD:ON
IC20
FREQ DOUBLER
QR32
QR36
VR11
SS HSW
IC33,C114
6.66msec DELAY
IC35
IC36
TP10
D48,49
QR30
QR38
QR35
Q59
R/P HSW:ON
PB HSW:ON
(HSW SELECT CIRCUIT)
1/2V OUT:ON
QR36-C
QR39-C
IC35-3
TP10
6.66msec
HSW
TO VIDEO
HEAD SW
V PULSE
P2001
QR16
IC36
QR28
IC33,C134
INTEGRATION
Q23
C119,IC33
0.4msec DELAY
QR15
IC20,C118
FREQ DOUBLER
(ARTIFICIAL V CIRCUIT)
QR29
CF ON
FRAME ON
P2016
TO COLOUR FRAMING
CF ON
TO INTERFACE
P2003
QR28-B
QR15-C
IC33-14
Q23-C
QR16-C
0.4msec
0.52msec
TO COLOUR FRAMING
CTL
CAP.PHASE OUT
HEAD SW
P2015
VIDEO R/P
D17
QR4
X1
X2
REF 4.43MHz
5Vp-p 30Hz
0.8Vp-p 4.43MHz
FROM CHROMA
P2007
HSW PULSE
4.8Vp-p 25Hz
TP2
IC8 (MN6168VIA)
4.43MHz CLOCK
REC
LATCH PULSE GENERATOR
COUNT DOWN CLOCK 25Hz
PB
DIGITAL TRAPEZOID GENERATOR
PWM
PHASE
SPEED
CONTROL PULSE GENERATOR
4.8Vp-p 3.5kHz 50%-50% DUTY AT SPECIFIC SPEED
TP5
TP4
R204
R37
IC42
C110
L.P.F.
4.8Vp-p 13.9kHz 50%-50% DUTY AT SPECIFIC SPEED
R201,C108
LPF
IC10
FILTER CIRCUIT
SPEED UP → VOLTAGE UP
NORMAL → 2.5V
SPEED DOWN → VOLTAGE DOWN
QR1
+PG SHIFTER
VR7
-PG SHIFTER
VR6
+MMV
-MMV
FF
SCHMITT
IC7 (AN6346N)
C82
IC24
20Vp-p 200Hz
CYL PG
SCHMIT OUT
IC7-16
IC7-15
IC7-14
5Vp-p NORMAL...200Hz
H:CYL ON
1/2 VCC
LOCK DET
FEED BACK
PRE AMP
3 DIFFERENTIAL AMP
ET
B-FG
FG GENERATOR
POSITION SENSOR
4Vp-p 25Hz
TP1
4.8Vp-p NORMAL:758Hz
4.8Vp-p 50%-50% DUTY AT TRACKING CENTER POSITION(NORMAL)
EWD1 REV
CAP SP 3
CAP SP 2
CAP SP 1
CAP SP 0
SPEED DATA
COUNT DOWN
DIGITAL MMV
LATCH PULSE GENERATOR
COUNT DOWN CLOCK
DIGITAL TRAPEZOID GENERATOR
PWM
LATCH PULSE GENERATOR
IC8 (MN6168VIA)
R/P
FWD×1
PICH CTL
CAP X1/5~X1/25
4.8Vp-p 3.5kHz 50%-50% DUTY AT SPECIFIC SPEED
C55
IC17
TP9
R100,C39
R101,C40
LPF
TP8
SPEED UP → VOLTAGE UP
NORMAL → DC 2.5V
SPEED DOWN → VOLTAGE DOWN
4.8Vp-p 14kHz 50%-50% DUTY AT SPECIFIC SPEED
+3.8V
+1.2V
IC16
(CAPSTAN LOCK DETECTOR)
IC42
IC2512
QR11
IC3
C63
FILTER CIRCUIT
IC6 (AN6357N)
AMP
GAIN B
GAIN C
GAIN 1/2
QR18
D5
IC40
S/H
TRAPEZOID GENE
IC42
IC11
Q11
Q12
QR17
QR19
TP17
PAUSE:ON
Q22
IC2512
CONTROL HEAD
P2008
TRACKING VR6310
P2009
VR1 TRACKING
4.8Vp-p 25Hz
Q57
QR8
IC15
Q51
Q30,31 IC3
MMV
TO INTERFACE
P2003
CTL PULSE
IC7(AN6346N)
AMP
TRACKING
REV SW
FROM SYSTEM CONTROL
BRAKE OFF
P2002
QR25
REV:ON
IC15
R141
R142
R115
IC21
IC14
CAP ×1/25:ON
CAP ×1/5:ON
TP14
25Hz 225mV
C54
EXCEPT CAP ×1/5~×1/25:ON
(LOADING UNLOADING PINCH OFF):ON
PINCH ON:ON
Q50
Q29
Q25
BRAKE OFF :ON
TP15
CAP ×10~×1/5
CAP ×1/10
CAP ×1/25
×1/2~×1/5
1/2 COUNT DOWN
IC16 FREQUENCY DOUBLER
IC17
IC22 R/P SWITCHING PULSE GENE
IC4,5 PRESET PULSE GENERATOR
RESET
CLK
IC4
SET
FWD/REW ROTATION DETECTOR (DURING A FRAME)
FWD
REV
IC19.5
(CTL MASKING CIRCUIT)
IC15
AMP
CAPSTAN PHASE LOOP
CAPSTAN SPEED LOOP
CYLINDER PHASE LOOP
CYLINDER SPEED LOOP
REF.NO 2000 SER

IC1 (μPD1511AC092)

PIN NO.	NAME	I/O	FUNCTION	ACTIVE	ACTIVE	FUNCTION	I/O	NAME	PIN NO.
1	PG0	—	———	—	L	INTERRUPT.REQUEST	I	INT	42
2	PG1				+5V	+5V	I	Vcc	41
3	PG2				H	CAP SP3	0	PF3	40
4	PG3				H	CAP SP2	0	PF2	39
5	PH0	0	CTL ON	L	H	CAP SP1	0	PF1	38
6	PH1		———		H	CAP SP0	0	PF0	37
7	PH2	0	CAP ERROR	H	H	MUTE	0	PE3	36
8	PH3	0	BRAKE	L	H	CAP REV	0	PE2	35
9	SI	I	SERIAL DATA IN	—	L	CAP SLOW	0	PE1	34
10	S0	0	SERIAL DATA OUT	—	H	CAP ON	0	PE0	33
11	SCK	I	SERIAL CLOCK	—	H	1/10	0	PD3	32
12	PA0	—	———	—	H	1/25	0	PD2	31
13	PA1	I	CYL REF		H	1/5~1/25	0	PD1	30
14	PA2	I	HEAD SW	30Hz	H	X10 ~1/5	0	PD0	29
15	PA3	I	CAP LOCK	H	L	1/2~1/25	0	PC3	28
16	PB0	I	FORCED LOCK OFF	L	—	———	—	PC2	27
17	PB1	I	COMPULSION SERVO LOCK	L	H	PAUSE	0	PC1	26
18	PB2	I	FRAME LOCK	H	L	R/P CTL	0	PC0	25
19	PB3	I	HD ON	L	L	RESET	I	RESET	24
20	TEST	—	GND	—	3.58MHz	MICROCOMPUTER CLOCK SIGNAL	I	X2	23
21	GND						I	X1	22

IC2 (μPD1511AC103)

PIN NO.	NAME	I/O	FUNCTION	ACTIVE	ACTIVE	FUNCTION	I/O	NAME	PIN NO.
1	PG0	0	FF/REW	H	L	INTERRUPT.REQUEST	I	INT	42
2	PG1	0	EXTERNAL	H	+5V	+5V	I	Vcc	41
3	PG2	0	INTERNAL	H	—	———	—	PF3	40
4	PG3	0	PICH CTL	H	—	———	—	PF2	39
5	PH0	0	H PHASE	H	H	1/5	0	PF1	38
6	PH1	0	CAP SP1	H	L	PINCH ON	0	PF0	37
7	PH2	0	NOT FRAMING	H	L	1/5~1/25	0	PE3	36
8	PH3	0	CTL AMP SW REV	H	H	-1~STILL~1/2	0	PE2	35
9	SI	I	SERIAL DATA	—	—	———	—	PE1	34
10	S0	—	———	—	—	———	—	PE0	33
11	SCK	I	SERIAL CLOCK	—	L	FORCED LOCK OFF	0	PD3	32
12	PA0	I	INCOME V	—	H	SS H.SW	0	PD2	31
13	PA1	I	EXT V	—	H	FWD 1	0	PD1	30
14	PA2	—	———	—	H	FWD PB ONLY	0	PD0	29
15	PA3	—	———	—	H	CAP 6.10 REW	0	PC3	28
16	PB0	0	MUTE	L	L	CAP 6.10 FWD	0	PC2	27
17	PB1	0	R/P H.SW	H	H	CAP GAIN C	0	PC1	26
18	PB2	0	PB H.SW	H	H	CAP GAIN B	0	PC0	25
19	PB3	0	1/2 V OUT	H	L	RESET	I	RESET	24
20	TEST	—	GND	—	3.58MHz	MICROCOMPUTER CLOCK SIGNAL	I	X2	23
21	GND						I	X1	22

MODE \ SIGNAL		REFERENCE SIGNAL	COMPARISON SIGNAL
REC	PHASE LOOP	CLOCK PULSE	CAPSTAN PG 25Hz
	SPEED LOOP	CLOCK PULSE	CAPSTAN FG
P.B	PHASE LOOP	CLOCK PULSE	CONTROL PULSE
	SPEED LOOP	CLOCK PULSE	CAPSTAN FG

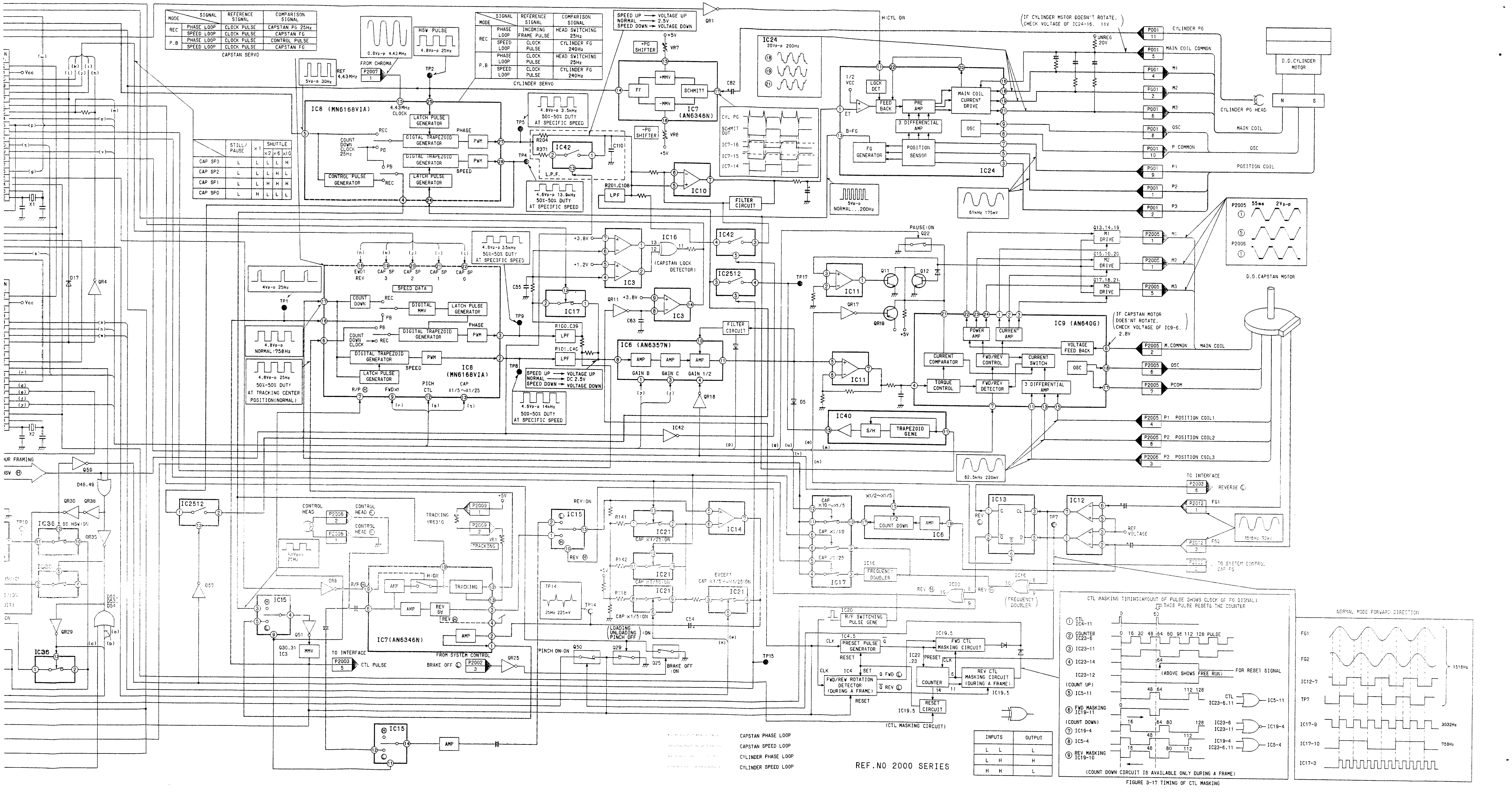
CAPSTAN SERVO

MODE \ SIGNAL		REFERENCE SIGNAL	COMPARISON SIGNAL
REC	PHASE LOOP	INCOMING FRAME PULSE	HEAD SWITCHING 25Hz
	SPEED LOOP	CLOCK PULSE	CYLINDER FG 240Hz
P.B	PHASE LOOP	CLOCK PULSE	HEAD SWITCHING 25Hz
	SPEED LOOP	CLOCK PULSE	CYLINDER FG 240Hz

CYLINDER SERVO

	STILL/PAUSE	×1	SHUTTLE		
			×2	×6	×10
CAP SP3	L	L	L	L	H
CAP SP2	L	L	L	H	L
CAP SP1	L	L	H	H	H
CAP SP0	L	H	L	L	L

SERVO (1) BLOCK



MODE \ SIGNAL		REFERENCE SIGNAL	COMPARISON SIGNAL
REC	PHASE LOOP	CLOCK PULSE	CAPSTAN PG 25Hz
	SPEED LOOP	CLOCK PULSE	CAPSTAN FG
P.B	PHASE LOOP	CLOCK PULSE	CONTROL PULSE
	SPEED LOOP	CLOCK PULSE	CAPSTAN FG

CAPSTAN SERVO

MODE \ SIGNAL		REFERENCE SIGNAL	COMPARISON SIGNAL
REC	PHASE LOOP	INCOMING FRAME PULSE	HEAD SWITCHING 25Hz
	SPEED LOOP	CLOCK PULSE	CYLINDER FG 240Hz
P.B	PHASE LOOP	CLOCK PULSE	HEAD SWITCHING 25Hz
	SPEED LOOP	CLOCK PULSE	CYLINDER FG 240Hz

CYLINDER SERVO

	STILL/ PAUSE	×1	SHUTTLE		
			×2	×6	×10
CAP SP3	L	L	L	L	H
CAP SP2	L	L	L	H	L
CAP SP1	L	L	H	H	H
CAP SP0	L	H	L	L	L

INPUTS		OUTPUT
L	L	L
L	H	H
H	H	L

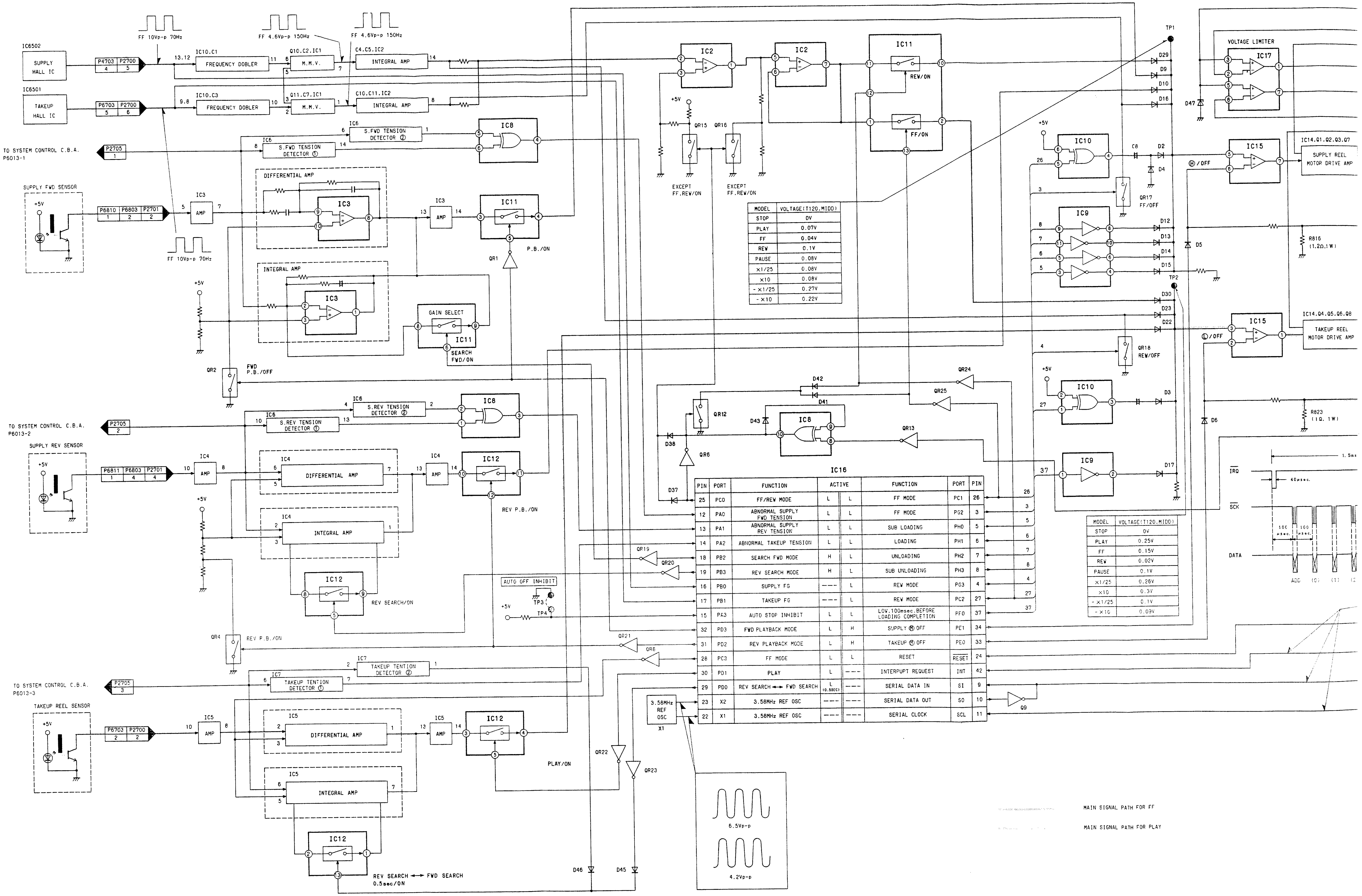
CAPSTAN PHASE LOOP
CAPSTAN SPEED LOOP
CYLINDER PHASE LOOP
CYLINDER SPEED LOOP

REF.NO 2000 SERIES

IC8 (MN6168VIA)
4.43MHz CLOCK
LATCH PULSE GENERATOR
DIGITAL TRAPEZOID GENERATOR
PWM
PHASE
SPEED
COUNT DOWN CLOCK 25Hz
CONTROL PULSE GENERATOR
REF 4.43MHz
5Vp-p 30Hz
FROM CHROMA
P2007
TP2
0.8Vp-p 4.43MHz
HSW PULSE
4.8Vp-p 25Hz
TP5
4.8Vp-p 3.5kHz 50%-50% DUTY AT SPECIFIC SPEED
TP4
R204
R371
IC42
C1101
L.P.F.
4.6Vp-p 13.9kHz 50%-50% DUTY AT SPECIFIC SPEED
SPEED UP → VOLTAGE UP
NORMAL → 2.5V
SPEED DOWN → VOLTAGE DOWN
QR1
+PG SHIFTER
VR7
-PG SHIFTER
VR8
FF
+MMV
-MMV
SCHMITT
IC7 (AN6346N)
C82
CYL PG
SCHMIT OUT
IC7-16
IC7-15
IC7-14
IC10
R201.C108
LPF
FILTER CIRCUIT
IC24
20Vp-p 200Hz
5Vp-p NORMAL...200Hz
H:CYL ON
1/2 VCC
LOCK DET
FEED BACK
PRE AMP
MAIN COIL CURRENT DRIVE
3 DIFFERENTIAL AMP
OSC
FG GENERATOR
POSITION SENSOR
B-FG
61kHz 175mV
(IF CYLINDER MOTOR DOESN'T ROTATE, CHECK VOLTAGE OF IC24-16. 11V
UNREG 20V
P001
CYLINDER PG
MAIN COIL COMMON
M1
M2
M3
OSC
P COMMON
P1
P2
P3
D.D.CYLINDER MOTOR
CYLINDER PG HEAD
MAIN COIL
POSITION COIL
N
S
EWD1 REV
CAP SP 3
CAP SP 2
CAP SP 1
CAP SP 0
SPEED DATA
4Vp-p 25Hz
TP1
COUNT DOWN
DIGITAL MMV
4.8Vp-p NORMAL 758Hz
4.8Vp-p 25Hz 50%-50% DUTY AT TRACKING CENTER POSITION(NORMAL)
R/P
FWD×1
PITCH CTL
CAP X1/5~X1/25
4.9Vp-p 35kHz 50%-50% DUTY AT SPECIFIC SPEED
C55
IC16
IC3
(CAPSTAN LOCK DETECTOR)
IC17
QR11
C63
TP9
R100.C39
R101.C40
TP8
IC6 (AN6357N)
AMP
GAIN B
GAIN C
GAIN 1/2
QR18
4.5Vp-p 14kHz 50%-50% DUTY AT SPECIFIC SPEED
IC42
IC2512
TP17
PAUSE:ON
Q22
IC11
Q11
Q12
QR17
QR19
+5V
D5
IC40
S/H
TRAPEZOID GENE
62.5kHz 220mV
Q13.14.19 M1 DRIVE
Q15.10.20 M2 DRIVE
Q17.18.21 M3 DRIVE
P2005
P2006
55mA 2Vp-p
D.D.CAPSTAN MOTOR
IC9 (AN6406)
POWER AMP
CURRENT AMP
(IF CAPSTAN MOTOR DOES'NT ROTATE, CHECK VOLTAGE OF IC9-6. 2.8V
VOLTAGE FEED BACK
CURRENT COMPARATOR
FWD/REV CONTROL
CURRENT SWITCH
TORQUE CONTROL
FWD/REV DETECTOR
3 DIFFERENTIAL AMP
M.COMMON
PCOM
P1 POSITION COIL1
P2 POSITION COIL2
P3 POSITION COIL3
TO INTERFACE
P2003
REVERSE
FG1
FG2
REF VOLTAGE
1516Hz 72mV
TO SYSTEM CONTROL CAP FG
IC13
IC12
TP7
CAP ×10~×1/5
×1/2~×1/25
1/2 COUNT DOWN
AMP
IC6
CAP ×1/10
CAP ×1/25
IC17
IC16 FREQUENCY DOUBLER
IC20
R/F SWITCHING PULSE GENE
IC4.5 PRESET PULSE GENERATOR
CLK
RESET
SET
FWD/REV ROTATION DETECTOR (DURING A FRAME)
Q FWD
Q REV
IC22 .23
PRESET
COUNTER
IC19.5
FWD CTL MASKING CIRCUIT
REV CTL MASKING CIRCUIT (DURING A FRAME)
RESET CIRCUIT
(CTL MASKING CIRCUIT)
OUR FRAMING
HSW
Q59
D48.49
QR30
QR38
IC36
SS HSW:ON
QR35
QR29
Q57
D52. D53. D54
IC2512
CONTROL HEAD
P2005
CONTROL HEAD
TRACKING VR531G
P2009
VR1
TRACKING
4.6Vp-p 25Hz
QR8
IC15
Q51
Q30.31 IC3
MMV
IC7(AN6346N)
H:ON
AMP
TRACKING
REV SW
TO INTERFACE
P2003
CTL PULSE
FROM SYSTEM CONTROL
BRAKE OFF
P2002
QR25
REV:ON
R141
R142
R118
IC21
CAP ×1/25:ON
CAP ×1/10:ON
CAP ×1/5:ON
IC14
EXCEPT CAP ×1/5~×1/25:ON
TP14
25Hz 225mV
C54
(LOADING UNLOADING :ON PINCH OFF)
PINCH ON:ON
Q50
Q29
Q25
BRAKE OFF :ON
TP15
IC15
AMP
NORMAL MODE FORWARD DIRECTION
IC12-7
IC17-9
IC17-10
IC17-3
3032Hz
758Hz
CTL MASKING TIMING(AMOUNT OF PULSE SHOWS CLOCK OF FG SIGNAL)
THIS PULSE RESETS THE COUNTER
① CTL IC4-11
② COUNTER IC23-6
③ IC23-11
④ IC23-14
IC23-12
(COUNT UP)
⑤ IC5-11
⑥ FWD MASKING IC19-11
(COUNT DOWN)
⑦ IC19-4
⑧ IC5-4
⑨ REV MASKING IC19-10
0 16 32 48 64 80 96 112 128 PULSE
FOR RESET SIGNAL
(ABOVE SHOWS FREE RUN)
CTL
IC23-6.11
IC5-11
IC23-6
IC23-11
IC19-4
IC5-4
(COUNT DOWN CIRCUIT IS AVAILABLE ONLY DURING A FRAME)

FIGURE 3-17 TIMING OF CTL MASKING

REEL SERVO BLOCK DIAGRAM


IC6502
SUPPLY HALL IC
IC6501
TAKEUP HALL IC
P4703
P2700
P6703
FF 10Vp-p 70Hz
FF 4.6Vp-p 150Hz
IC10.C1 FREQUENCY DOBLER
IC10.C3 FREQUENCY DOBLER
Q10.C2.IC1 M.M.V.
Q11.C7.IC1 M.M.V.
C4.C5.IC2 INTEGRAL AMP
C10.C11.IC2 INTEGRAL AMP
TO SYSTEM CONTROL C.B.A. P6013-1
TO SYSTEM CONTROL C.B.A. P6013-2
TO SYSTEM CONTROL C.B.A. P6013-3
P2705
IC6 S.FWD TENSION DETECTOR ①
IC6 S.FWD TENSION DETECTOR ②
IC6 S.REV TENSION DETECTOR ①
IC6 S.REV TENSION DETECTOR ②
IC7 TAKEUP TENTION DETECTOR ①
IC7 TAKEUP TENTION DETECTOR ②
IC8
SUPPLY FWD SENSOR
SUPPLY REV SENSOR
TAKEUP REEL SENSOR
P6810 P6803 P2701
P6811 P6803 P2701
IC3 AMP
DIFFERENTIAL AMP
INTEGRAL AMP
GAIN SELECT
IC11
SEARCH FWD/ON
P.B./ON
QR1
QR2
FWD P.B./OFF
IC4 AMP
IC4 DIFFERENTIAL AMP
IC4 INTEGRAL AMP
IC12
REV P.B./ON
REV SEARCH/ON
QR4
REV P.B./ON
IC5 AMP
IC5 DIFFERENTIAL AMP
IC5 INTEGRAL AMP
PLAY/ON
REV SEARCH ←→ FWD SEARCH 0.5sec/ON
+5V
IC2
IC11
REW/ON
FF/ON
QR15
QR16
EXCEPT FF.REW/ON
EXCEPT FF.REW/ON
TP1
TP2
TP3
TP4
AUTO OFF INHIBIT
QR19
QR20
QR21
QR8
QR22
QR23
D46
D45
3.58MHz REF OSC
X1
6.5Vp-p
4.2Vp-p
IC16
QR12
QR6
QR13
QR24
QR25
D42
D41
D43
D38
D37
IC10
IC9
IC8
C8
D2
D4
D3
D5
D6
D9
D10
D12
D13
D14
D15
D16
D17
D22
D23
D29
D30
D47
QR17 FF/OFF
QR18 REW/OFF
VOLTAGE LIMITER
IC17
IC15
Ⓗ/OFF
Ⓒ/OFF
IC14.Q1.Q2.Q3.Q7 SUPPLY REEL MOTOR DRIVE AMP
IC14.Q4.Q5.Q6.Q8 TAKEUP REEL MOTOR DRIVE AMP
R816 (1.2Ω.1W)
R823 (1Ω.1W)
Q9
IRQ
SCK
DATA
1.5ms
40μsec.
10C μsec.
160 μsec.
ADD
MAIN SIGNAL PATH FOR FF
MAIN SIGNAL PATH FOR PLAY

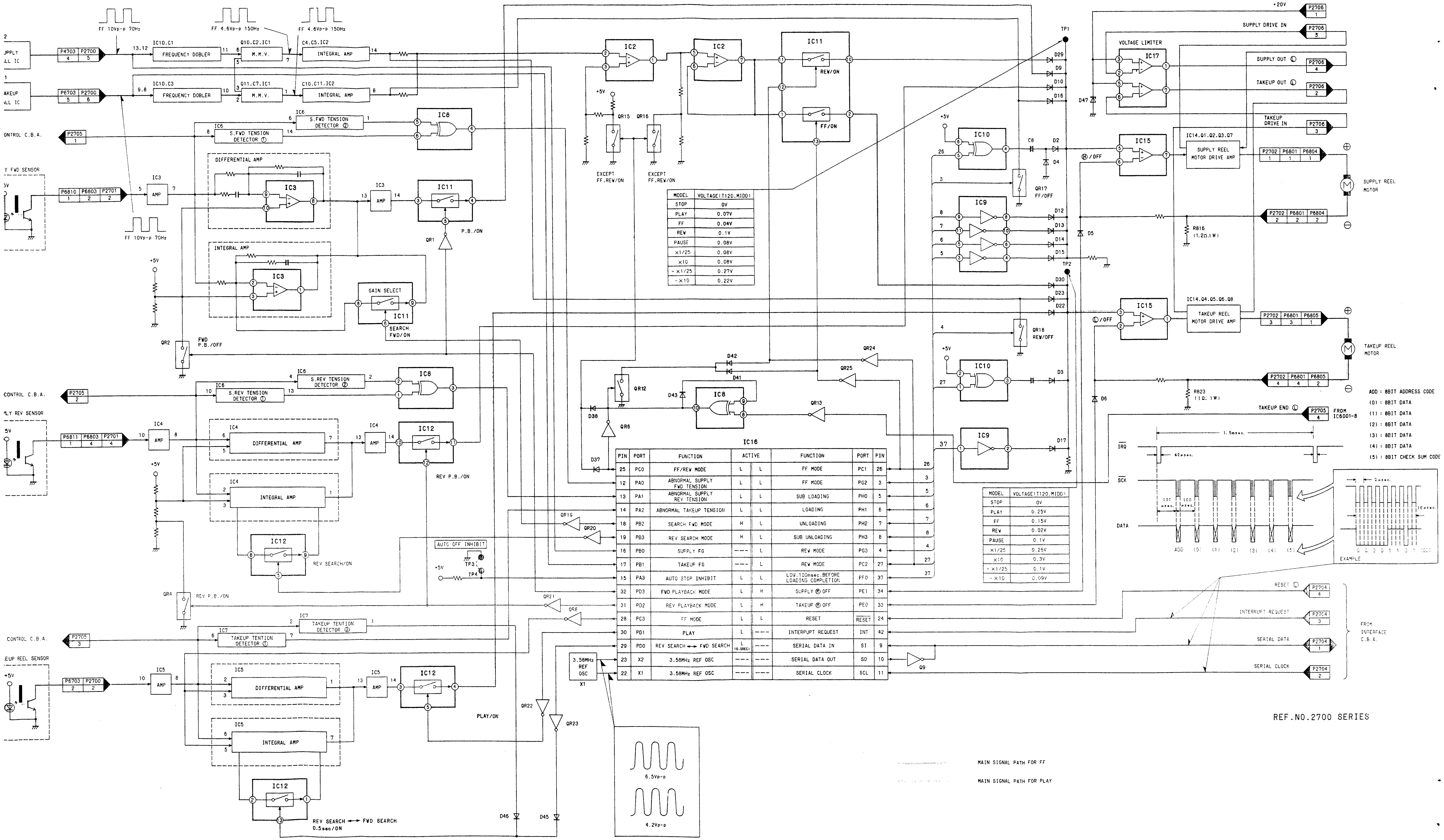
MODEL	VOLTAGE(T120.MIDD)
STOP	0V
PLAY	0.07V
FF	0.04V
REW	0.1V
PAUSE	0.08V
×1/25	0.08V
×10	0.08V
-×1/25	0.27V
-×10	0.22V

IC16

PIN	PORT	FUNCTION	ACTIVE		FUNCTION	PORT	PIN
25	PC0	FF/REW MODE	L	L	FF MODE	PC1	26
12	PA0	ABNORMAL SUPPLY FWD TENSION	L	L	FF MODE	PG2	3
13	PA1	ABNORMAL SUPPLY REV TENSION	L	L	SUB LOADING	PH0	5
14	PA2	ABNORMAL TAKEUP TENSION	L	L	LOADING	PH1	6
18	PB2	SEARCH FWD MODE	H	L	UNLOADING	PH2	7
19	PB3	REV SEARCH MODE	H	L	SUB UNLOADING	PH3	8
16	PB0	SUPPLY FG	---	L	REW MODE	PG3	4
17	PB1	TAKEUP FG	---	L	REW MODE	PC2	27
15	PA3	AUTO STOP INHIBIT	L	L	LOW.100msec.BEFORE LOADING COMPLETION	PF0	37
32	PD3	FWD PLAYBACK MODE	L	H	SUPPLY Ⓜ OFF	PE1	34
31	PD2	REV PLAYBACK MODE	L	H	TAKEUP Ⓜ OFF	PE0	33
28	PC3	FF MODE	L	L	RESET	$\overline{\text{RESET}}$	24
30	PD1	PLAY	L	---	INTERPUPT REQUEST	INT	42
29	PD0	REV SEARCH ←→ FWD SEARCH	L (0.5SEC)	---	SERIAL DATA IN	SI	9
23	X2	3.58MHz REF OSC	---	---	SERIAL DATA OUT	SO	10
22	X1	3.58MHz REF OSC	---	---	SERIAL CLOCK	SCL	11

MODEL	VOLTAGE(T120.MIDD)
STOP	0V
PLAY	0.25V
FF	0.15V
REW	0.02V
PAUSE	0.1V
×1/25	0.26V
×10	0.3V
-×1/25	0.1V
-×10	0.09V

. SERVO BLOCK DIAGRAM


FF 10Vp-p 70Hz
FF 4.6Vp-p 150Hz
FF 4.6Vp-p 150Hz
FREQUENCY DOBLER
M.M.V.
INTEGRAL AMP
IC10.C1
Q10.C2.IC1
C4.C5.IC2
IC10.C3
Q11.C7.IC1
C10.C11.IC2
P4703 P2700
P6703 P2700
S.FWD TENSION DETECTOR ①
S.FWD TENSION DETECTOR ②
IC6
IC8
CONTROL C.B.A.
P2705
DIFFERENTIAL AMP
INTEGRAL AMP
IC3
IC11
GAIN SELECT
SEARCH FWD/ON
P.B./ON
QR1
QR2
FWD P.B./OFF
P6810 P6803 P2701
S.REV TENSION DETECTOR ①
S.REV TENSION DETECTOR ②
IC4
IC12
REV P.B./ON
REV SEARCH/ON
QR4
P6811 P6803 P2701
TAKEUP TENTION DETECTOR ①
TAKEUP TENTION DETECTOR ②
IC7
IC5
PLAY/ON
REV SEARCH ⟷ FWD SEARCH 0.5sec/ON
P6703 P2700
+5V
IC2
IC11
REW/ON
FF/ON
QR15 QR16
EXCEPT FF.REW/ON
EXCEPT FF.REW/ON
TP1
D29 D9 D10 D16
VOLTAGE LIMITER
IC17
D47
+20V
P2706
SUPPLY DRIVE IN
SUPPLY OUT Ⓒ
TAKEUP OUT Ⓒ
TAKEUP DRIVE IN
IC10
C8 D2 D4
QR17 FF/OFF
Ⓜ/OFF
IC15
IC14.Q1.Q2.Q3.Q7
SUPPLY REEL MOTOR DRIVE AMP
P2702 P6801 P6804
SUPPLY REEL MOTOR
R816 (1.2Ω.1W)
IC9
D12 D13 D14 D15
D5
TP2
D30 D23 D22
IC14.Q4.Q5.Q6.Q8
TAKEUP REEL MOTOR DRIVE AMP
P2702 P6801 P6805
TAKEUP REEL MOTOR
QR18 REW/OFF
Ⓜ/OFF
QR24 QR25
D42 D41
QR12
D43
IC8
QR13
D38
QR6
D37
D3
R823 (1Ω. 1W)
D6
TAKEUP END Ⓒ
P2705
FROM IC6001-8
D17
IC16
QR19 QR20
AUTO OFF INHIBIT
TP3 TP4
QR21 QR8
3.58MHz REF OSC
X1
Q9
QR22 QR23
D46 D45
6.5Vp-p
4.2Vp-p
IRQ
SCK
DATA
1.5msec.
40μsec.
2μsec.
16μsec.
ADD (0) (1) (2) (3) (4) (5)
EXAMPLE
RESET Ⓒ
INTERRUPT REQUEST
SERIAL DATA
SERIAL CLOCK
P2704
FROM INTERFACE C.B.A.
ADD : 8BIT ADDRESS CODE
(0) : 8BIT DATA
(1) : 8BIT DATA
(2) : 8BIT DATA
(3) : 8BIT DATA
(4) : 8BIT DATA
(5) : 8BIT CHECK SUM CODE
MAIN SIGNAL PATH FOR FF
MAIN SIGNAL PATH FOR PLAY

MODEL	VOLTAGE(T120.MIDD)
STOP	0V
PLAY	0.07V
FF	0.04V
REW	0.1V
PAUSE	0.08V
×1/25	0.08V
×10	0.08V
-×1/25	0.27V
-×10	0.22V

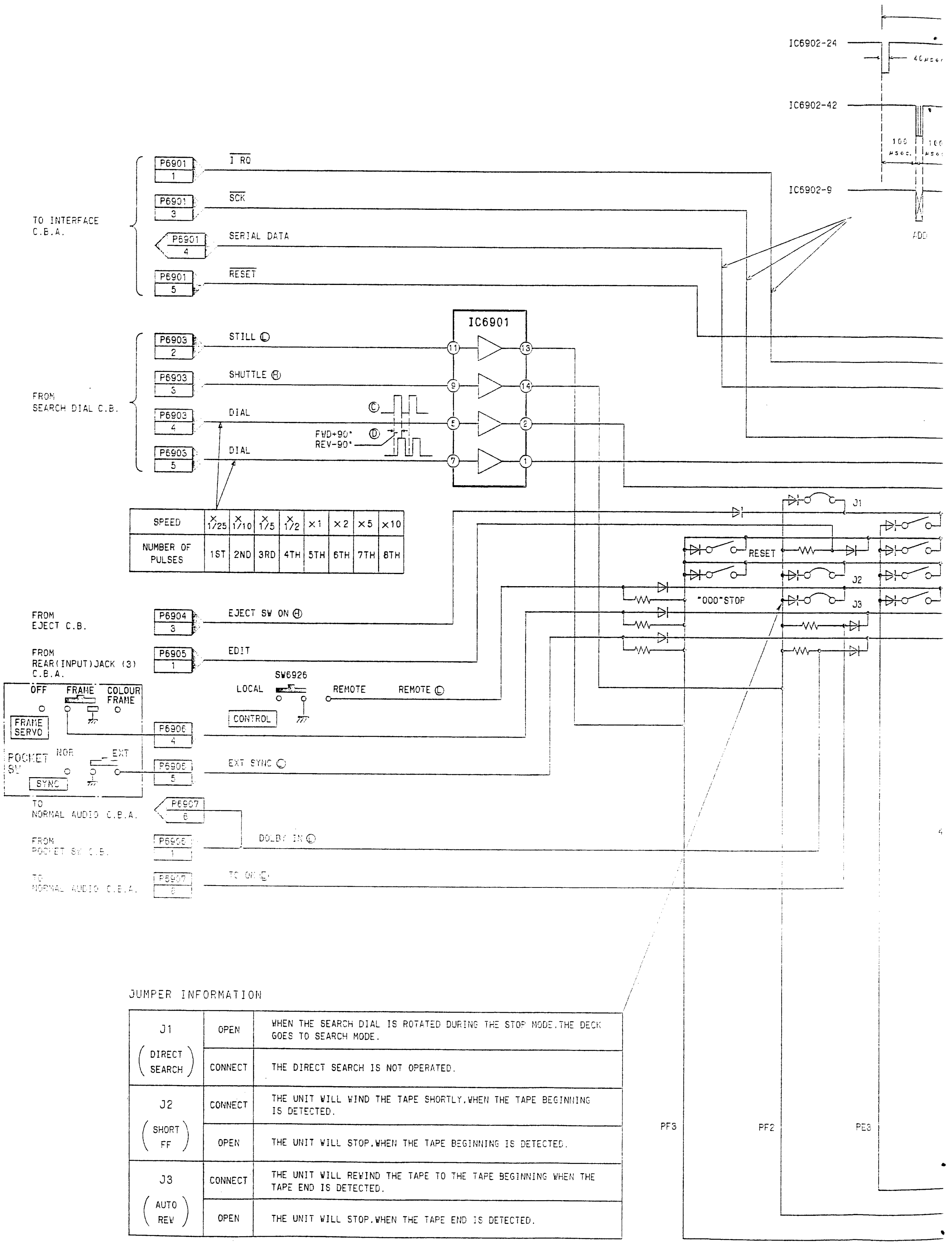
IC16

PIN	PORT	FUNCTION	ACTIVE		FUNCTION	PORT	PIN
25	PC0	FF/REW MODE	L	L	FF MODE	PC1	26
12	PA0	ABNORMAL SUPPLY FWD TENSION	L	L	FF MODE	PG2	3
13	PA1	ABNORMAL SUPPLY REV TENSION	L	L	SUB LOADING	PH0	5
14	PA2	ABNORMAL TAKEUP TENSION	L	L	LOADING	PH1	6
18	PB2	SEARCH FWD MODE	H	L	UNLOADING	PH2	7
19	PB3	REV SEARCH MODE	H	L	SUB UNLOADING	PH3	8
16	PB0	SUPPLY FG	---	L	REW MODE	PG3	4
17	PB1	TAKEUP FG	---	L	REW MODE	PC2	27
15	PA3	AUTO STOP INHIBIT	L	L	LOW.100msec.BEFORE LOADING COMPLETION	PF0	37
32	PD3	FWD PLAYBACK MODE	L	H	SUPPLY Ⓜ OFF	PE1	34
31	PD2	REV PLAYBACK MODE	L	H	TAKEUP Ⓜ OFF	PE0	33
28	PC3	FF MODE	L	L	RESET	$\overline{\text{RESET}}$	24
30	PD1	PLAY	L	---	INTERPUPT REQUEST	INT	42
29	PD0	REV SEARCH ⟷ FWD SEARCH	L (0.5SEC)	---	SERIAL DATA IN	SI	9
23	X2	3.58MHz REF OSC	---	---	SERIAL DATA OUT	SO	10
22	X1	3.58MHz REF OSC	---	---	SERIAL CLOCK	SCL	11

MODEL	VOLTAGE(T120.MIDD)
STOP	0V
PLAY	0.25V
FF	0.15V
REW	0.02V
PAUSE	0.1V
×1/25	0.25V
×10	0.3V
-×1/25	0.1V
-×10	0.09V

REF.NO.2700 SERIES

KEY BOARD BLOCK DIAGRAM

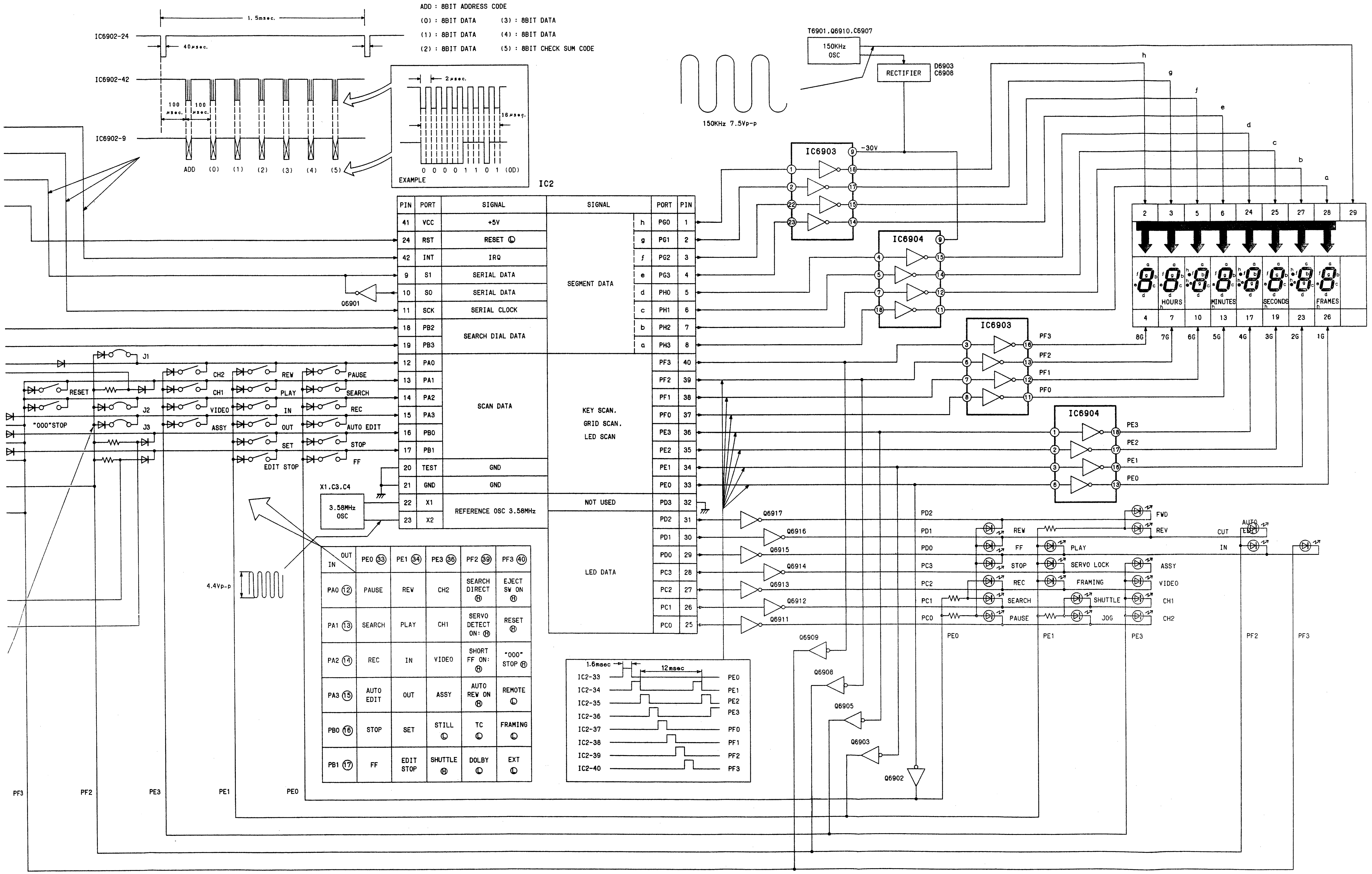

IC6902-24
40µsec
IC6902-42
100 µsec.
100 µsec
IC6902-9
ADD
TO INTERFACE C.B.A.
P6901 1
I RQ
P6901 3
SCK
P6901 4
SERIAL DATA
P6901 5
RESET
IC6901
FROM SEARCH DIAL C.B.
P6903 2
STILL Ⓛ
P6903 3
SHUTTLE Ⓗ
P6903 4
DIAL
P6903 5
DIAL
Ⓒ
FWD+90°
REV-90°
Ⓓ
11
13
9
14
5
2
7
1
FROM EJECT C.B.
P6904 3
EJECT SW ON Ⓗ
FROM REAR(INPUT)JACK (3) C.B.A.
P6905 1
EDIT
SW6926
LOCAL
REMOTE
REMOTE Ⓛ
CONTROL
OFF
FRAME
COLOUR FRAME
FRAME SERVO
P6906 4
POCKET SW
NOR
EXT
SYNC
P6906 5
EXT SYNC Ⓛ
TO NORMAL AUDIO C.B.A.
P6907 6
DOLBY IN Ⓛ
FROM POCKET SW C.B.
P6908 1
TO NORMAL AUDIO C.B.A.
P6907 8
J1
RESET
J2
"ODO"STOP
J3
PF3
PF2
PE3

SPEED	× 1/25	× 1/10	× 1/5	× 1/2	×1	×2	×5	×10
NUMBER OF PULSES	1ST	2ND	3RD	4TH	5TH	6TH	7TH	8TH

JUMPER INFORMATION

J1	OPEN	WHEN THE SEARCH DIAL IS ROTATED DURING THE STOP MODE.THE DECK GOES TO SEARCH MODE.
(DIRECT SEARCH)	CONNECT	THE DIRECT SEARCH IS NOT OPERATED.
J2	CONNECT	THE UNIT WILL WIND THE TAPE SHORTLY.WHEN THE TAPE BEGINNING IS DETECTED.
(SHORT FF)	OPEN	THE UNIT WILL STOP.WHEN THE TAPE BEGINNING IS DETECTED.
J3	CONNECT	THE UNIT WILL REWIND THE TAPE TO THE TAPE BEGINNING WHEN THE TAPE END IS DETECTED.
(AUTO REV)	OPEN	THE UNIT WILL STOP.WHEN THE TAPE END IS DETECTED.

FACTORY STANDARD

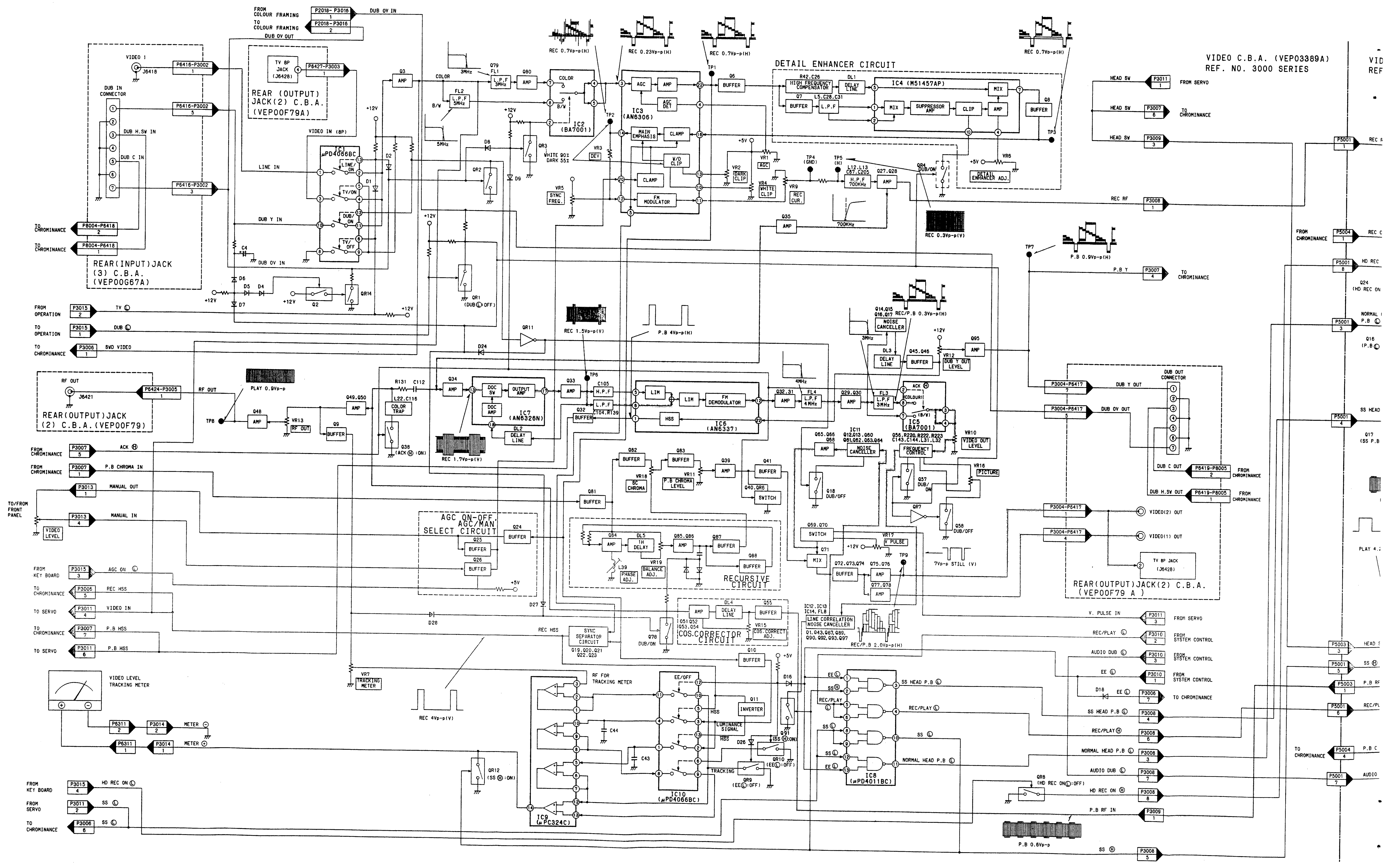

ADD : 8BIT ADDRESS CODE
(0) : 8BIT DATA
(3) : 8BIT DATA
(1) : 8BIT DATA
(4) : 8BIT DATA
(2) : 8BIT DATA
(5) : 8BIT CHECK SUM CODE
1.5msec.
IC6902-24
40μsec.
IC6902-42
100 μsec.
100 μsec.
IC6902-9
ADD (0) (1) (2) (3) (4) (5)
2μsec.
16μsec.
0 0 0 0 1 1 0 1 (0D)
EXAMPLE
IC2
T6901.Q6910.C6907
150KHz OSC
RECTIFIER
D6903 C6908
150KHz 7.5Vp-p
IC6903
-30V
IC6904
IC6903
IC6904
PF3
PF2
PF1
PF0
PE3
PE2
PE1
PE0
h g f e d c b a
2 3 5 6 24 25 27 28 29
HOURS
MINUTES
SECONDS
FRAMES
4 7 10 13 17 19 23 26
8G 7G 6G 5G 4G 3G 2G 1G
Q6901
J1
J2
J3
RESET
"000"STOP
CH2
CH1
VIDEO
ASSY
REW
PLAY
IN
OUT
SET
EDIT STOP
PAUSE
SEARCH
REC
AUTO EDIT
STOP
FF
X1.C3.C4
3.58MHz OSC
4.4Vp-p
Q6917
Q6916
Q6915
Q6914
Q6913
Q6912
Q6911
Q6909
Q6908
Q6905
Q6903
Q6902
PD2
PD1
PD0
PC3
PC2
PC1
PC0
FWD
REV
FF
PLAY
STOP
SERVO LOCK
ASSY
REC
FRAMING
VIDEO
SEARCH
SHUTTLE
CH1
PAUSE
JOG
CH2
CUT
IN
AUTO EDIT
PE0
PE1
PE3
PF2
PF3
1.6msec
12msec
IC2-33
IC2-34
IC2-35
IC2-36
IC2-37
IC2-38
IC2-39
IC2-40
PE0
PE1
PE2
PE3
PF0
PF1
PF2
PF3
PF3
PF2
PE3
PE1
PE0

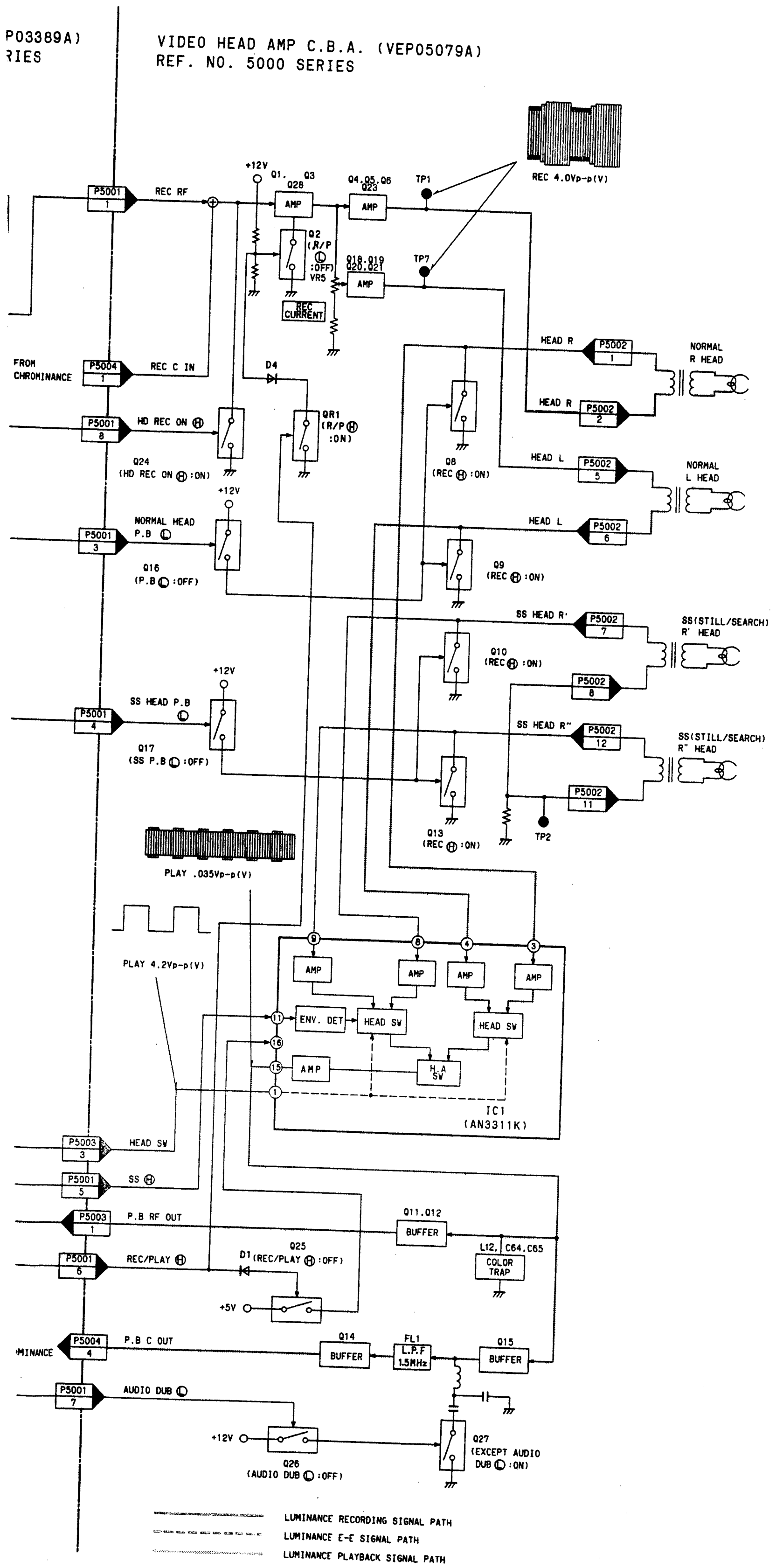
IC2

PIN	PORT	SIGNAL	SIGNAL		PORT	PIN
41	VCC	+5V	SEGMENT DATA	h	PG0	1
24	RST	RESET Ⓛ		g	PG1	2
42	INT	IRQ		f	PG2	3
9	S1	SERIAL DATA		e	PG3	4
10	S0	SERIAL DATA		d	PH0	5
11	SCK	SERIAL CLOCK		c	PH1	6
18	PB2	SEARCH DIAL DATA		b	PH2	7
19	PB3			a	PH3	8
12	PA0	SCAN DATA	KEY SCAN. GRID SCAN. LED SCAN		PF3	40
13	PA1				PF2	39
14	PA2				PF1	38
15	PA3				PF0	37
16	PB0				PE3	36
17	PB1				PE2	35
20	TEST	GND			PE1	34
21	GND	GND			PE0	33
22	X1	REFERENCE OSC 3.58MHz	NOT USED		PD3	32
23	X2		LED DATA		PD2	31
					PD1	30
					PD0	29
					PC3	28
					PC2	27
					PC1	26
					PC0	25

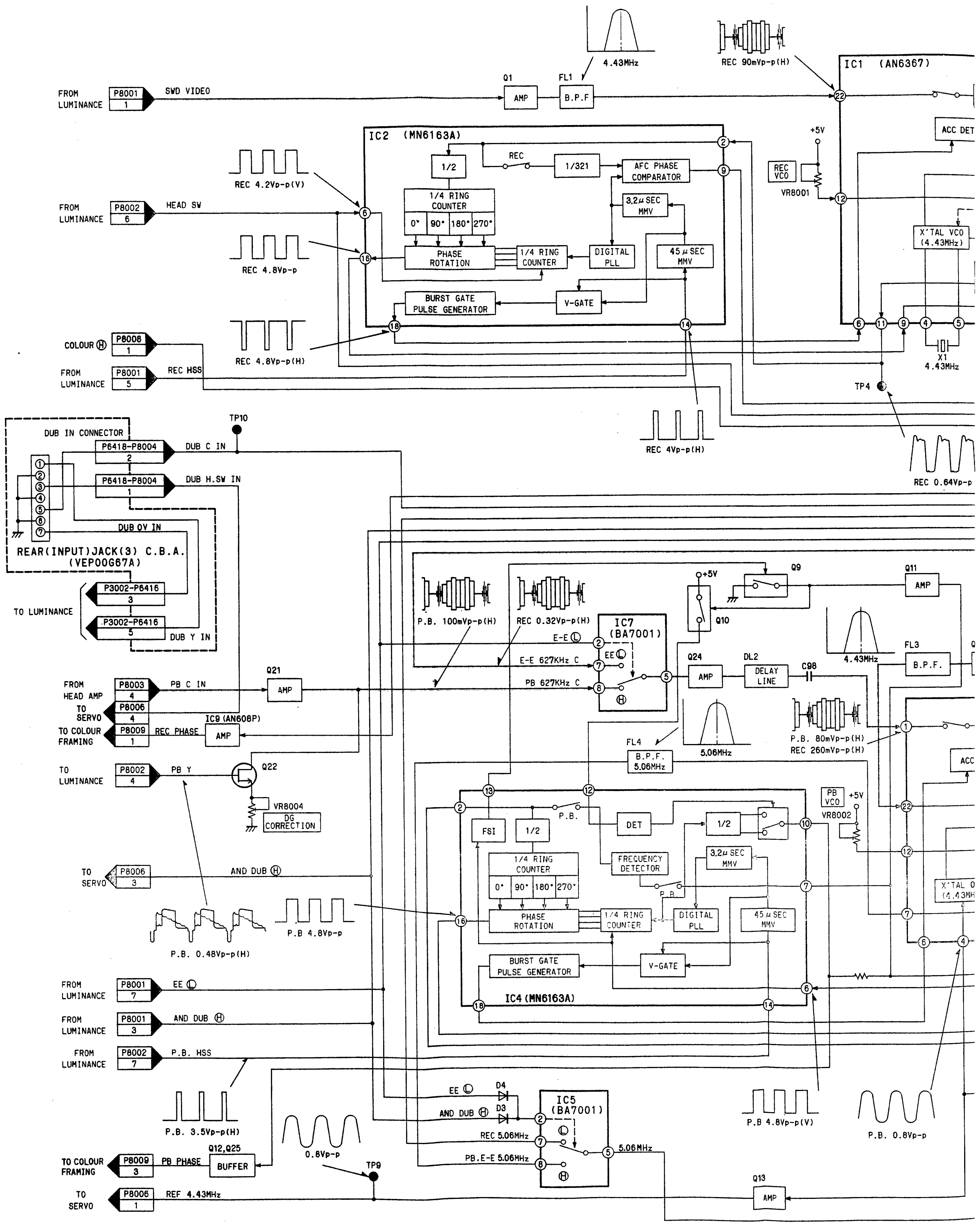
OUT / IN	PE0 ㉝	PE1 ㉞	PE3 ㊱	PF2 ㊴	PF3 ㊵
PA0 ⑫	PAUSE	REW	CH2	SEARCH DIRECT Ⓗ	EJECT SW ON Ⓗ
PA1 ⑬	SEARCH	PLAY	CH1	SERVO DETECT ON: Ⓗ	RESET Ⓗ
PA2 ⑭	REC	IN	VIDEO	SHORT FF ON: Ⓗ	"000" STOP Ⓗ
PA3 ⑮	AUTO EDIT	OUT	ASSY	AUTO REW ON Ⓗ	REMOTE Ⓛ
PB0 ⑯	STOP	SET	STILL Ⓛ	TC Ⓛ	FRAMING Ⓛ
PB1 ⑰	FF	EDIT STOP	SHUTTLE Ⓗ	DOLBY Ⓛ	EXT Ⓛ

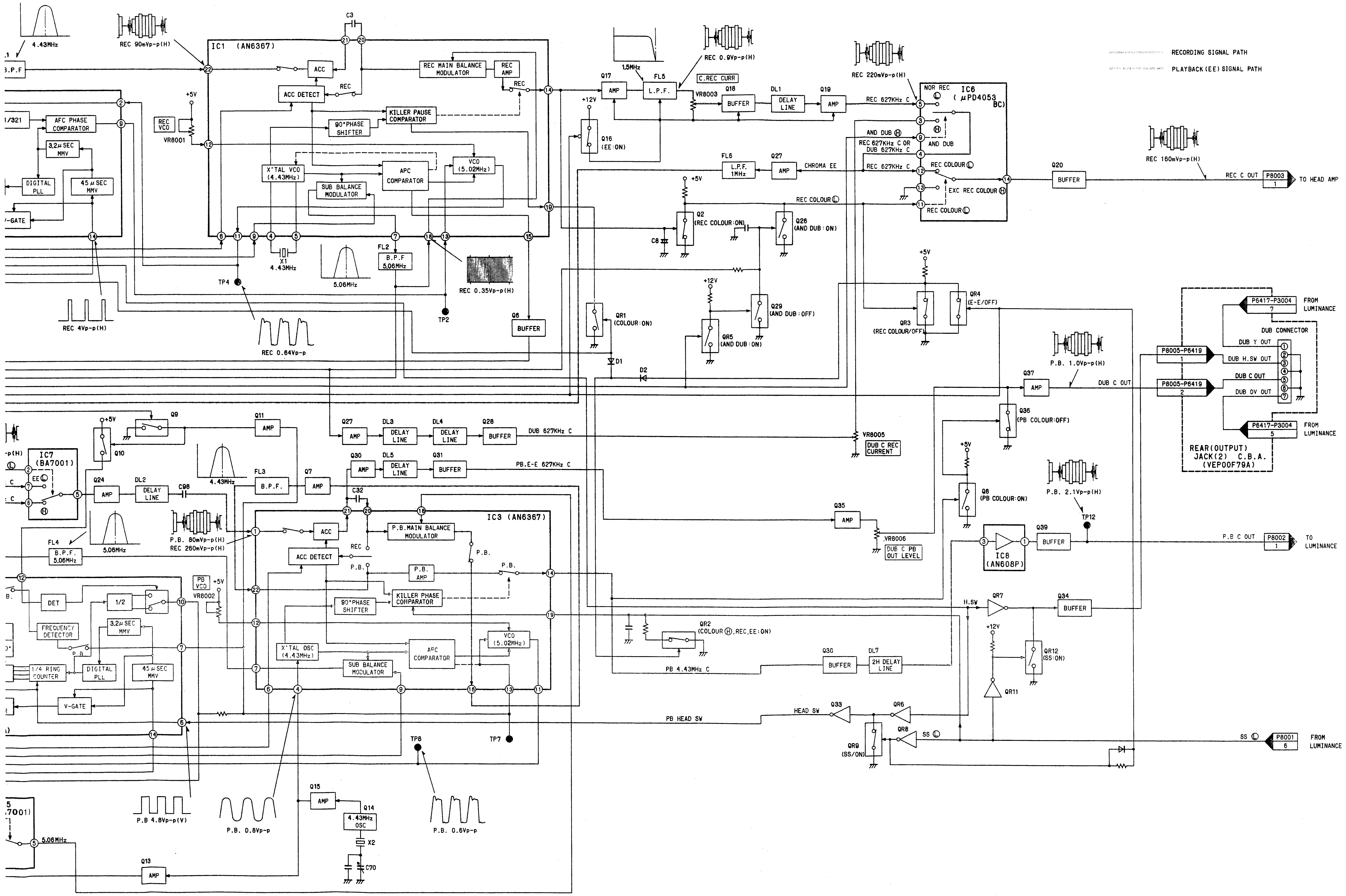
VIDEO BLOCK DIAGRAM


VIDEO C.B.A. (VEP03389A)
REF. NO. 3000 SERIES
FROM COLOUR FRAMING
TO COLOUR FRAMING
DUB OV IN
DUB OV OUT
VIDEO 1
J6418
DUB IN CONNECTOR
DUB H.SW IN
DUB C IN
REAR(INPUT)JACK (3) C.B.A. (VEP00G67A)
REAR (OUTPUT) JACK(2) C.B.A. (VEP00F79A)
TV 8P JACK (J6428)
VIDEO IN (8P)
LINE IN
DUB Y IN
IC1 μPD4066BC
LINE/ON
TV/ON
DUB/ON
TV/OFF
QR14
QR1 (DUB Ⓛ:OFF)
Q2
QR2
QR3
WHITE 90% DARK 55%
Q3 AMP
Q79 FL1 L.P.F 3MHz
Q80 AMP
FL2 L.P.F 5MHz
COLOR
B/W
IC2 (BA7001)
IC3 (AN6306)
AGC
AGC DET
MAIN EMPHASIS
CLAMP
W/D CLIP
FM MODULATOR
VR3 DEV
VR5 SYNC FREQ.
VR1 AGC
VR2 DARK CLIP
VR4 WHITE CLIP
VR9 REC CUR.
TP1
TP2
TP3
TP4 (GND)
TP5 (H)
TP6
TP7
TP8
TP9
Q6 BUFFER
DETAIL ENHANCER CIRCUIT
R42,C26 HIGH FREQUENCY COMPENSATOR
DL1 DELAY LINE
IC4 (M51457AP)
Q7 L5,C28,C31
MIX
SUPPRESSOR AMP
CLIP
AMP
Q8 BUFFER
VR6 DETAIL ENHANCER ADJ.
L12,L13 C67,C205 H.P.F 700KHz
Q27,Q28 AMP
Q84 DUB/ON
Q35 AMP
REC 0.7Vp-p(H)
REC 0.23Vp-p(H)
REC 0.3Vp-p(V)
P.B 0.9Vp-p(H)
REC 1.5Vp-p(V)
P.B 4Vp-p(H)
REC 1.7Vp-p(V)
PLAY 0.9Vp-p
REC 4Vp-p(V)
P.B 0.6Vp-p
REC/P.B 0.3Vp-p(H)
REC/P.B 2.0Vp-p(H)
7Vp-p STILL (V)
HEAD SW
FROM SERVO
TO CHROMINANCE
REC RF
P.B Y
TV Ⓛ
DUB Ⓛ
SVD VIDEO
RF OUT
J6421
REAR(OUTPUT)JACK (2) C.B.A.(VEP00F79)
ACK Ⓗ
P.B CHROMA IN
MANUAL OUT
MANUAL IN
TO/FROM FRONT PANEL
VIDEO LEVEL
AGC ON Ⓛ
PEC HSS
VIDEO IN
P.B HSS
FROM KEY BOARD
FROM OPERATION
TO OPERATION
FROM CHROMINANCE
TO SERVO
VIDEO LEVEL TRACKING METER
METER ⊖
METER ⊕
HD REC ON Ⓛ
SS Ⓛ
Q48 AMP
VR13 RF OUT
Q9 BUFFER
Q49,Q50 AMP
R131 C112 L22,C116 COLOR TRAP
Q38 (ACK Ⓗ:ON)
Q34 AMP
DOC SW
DOC AMP
OUTPUT AMP
IC7 (AN6326N)
DL2 DELAY LINE
Q33 AMP
C105 H.P.F
L.P.F
Q32 BUFFER
C104,R139
LIM
FM DEMODULATOR
HSS
IC6 (AN6337)
Q32,31 AMP
FL4 L.P.F 4MHz
Q29,Q30 AMP
FL3 L.P.F 3MHz
IC5 (BA7001)
(COLOUR)
(B/W)
Q14,Q15 Q16,Q17 NOISE CANCELLER
DL3 DELAY LINE
Q45,Q46 BUFFER
VR12 DUB Y OUT LEVEL
Q95 AMP
VR10 VIDEO OUT LEVEL
IC11 Q12,Q13,Q60 Q61,Q62,Q63,Q64 NOISE CANCELLER
Q65,Q66 Q68 AMP
Q56,R220,R222,R223 C143,C144,L31,L32 FREQUENCY CONTROL
VR16 PICTURE
Q57 DUB/ON
Q58 DUB/OFF
QR7
Q18 DUB/OFF
AGC ON-OFF AGC/MAN SELECT CIRCUIT
Q24 BUFFER
Q25 BUFFER
Q26 BUFFER
QR11
Q81 BUFFER
Q82 BUFFER
VR18 SC CHROMA
Q83 BUFFER
VR11 P.B CHROMA LEVEL
Q39 AMP
Q41 BUFFER
Q40,QR6 SWITCH
Q84 AMP
DL5 1H DELAY
Q85,Q86 AMP
Q87 BUFFER
Q88 BUFFER
L39 PHASE ADJ.
VR19 BALANCE ADJ.
RECURSIVE CIRCUIT
Q59,Q70 SWITCH
Q71 MIX
VR17 V PULSE
Q72,Q73,Q74 BUFFER
Q75,Q76 AMP
Q77,Q78 AMP
DL4 DELAY LINE
Q55 BUFFER
Q51,Q52 Q53,Q54
COS.CORRECTOR CIRCUIT
VR15 COS.CORRECT ADJ.
Q76 DUB/ON
IC12,IC13 IC14,FL8 LINE CORRELATION NOISE CANCELLER
Q1,Q43,Q67,Q89, Q90,Q92,Q93,Q97
REC HSS
SYNC SEPARATOR CIRCUIT Q19,Q20,Q21 Q22,Q23
Q10 BUFFER
VR7 TRACKING METER
RF FOR TRACKING METER
IC9 (μPC324C)
EE/OFF
IC10 (μPD4066BC)
C44
C43
Q11 INVERTER
LUMINANCE SIGNAL
TRACKING
QR9 (EEⓁ:OFF)
QR10 (EEⓁ:OFF)
Q91 SS Ⓗ:ON
D26
D16
QR12 (SS Ⓗ:ON)
IC8 (μPD4011BC)
SS HEAD P.B Ⓛ
REC/PLAY Ⓛ
SS Ⓛ
NORMAL HEAD P.B Ⓛ
EE Ⓛ
SS Ⓗ
QR8 (HD REC ONⓁ:OFF)
DUB OUT CONNECTOR
DUB Y OUT
DUB OV OUT
DUB C OUT
DUB H.SW OUT
VIDEO(2) OUT
VIDEO(1) OUT
TV 8P JACK (J6428)
REAR(OUTPUT)JACK(2) C.B.A. (VEP00F79 A)
V. PULSE IN
REC/PLAY Ⓛ
AUDIO DUB Ⓛ
EE Ⓛ
D18
FROM SYSTEM CONTROL
SS HEAD P.B Ⓛ
REC/PLAY Ⓗ
NORMAL HEAD P.B Ⓛ
HD REC ON Ⓗ
P.B RF IN
SS Ⓗ
P6416-P3002
P6427-P3003
P2018-P3016
P8004-P6418
P6424-P3005
P3015
P3006
P3007
P3013
P3011
P6311
P3014
P3004-P6417
P6419-P8005
P3010
P3009
P3008
P5001
P5003
P5004
Q24 (HD REC ON
Q16 (P.B Ⓛ
Q17 (SS P.B
NORMAL P.B Ⓛ
HD REC
REC RF
SS HEAD
HEAD S
SS Ⓗ
P.B RF
REC/P
P.B C
AUDIO
PLAY 4.


P03389A)
RIES
VIDEO HEAD AMP C.B.A. (VEP05079A)
REF. NO. 5000 SERIES
P5001 1 REC RF
+12V
Q1, Q3 Q28
AMP
Q4,Q5,Q6 Q23
AMP
TP1
REC 4.0Vp-p(V)
Q2 (R/P L :OFF)
VR5
Q18,Q19 Q20,Q21
AMP
TP7
REC CURRENT
FROM CHROMINANCE
P5004 1 REC C IN
D4
QR1 (R/P H :ON)
HEAD R P5002 1
NORMAL R HEAD
HEAD R P5002 2
P5001 8 HD REC ON H
Q24 (HD REC ON H :ON)
Q8 (REC H :ON)
HEAD L P5002 5
NORMAL L HEAD
HEAD L P5002 6
NORMAL HEAD P.B L
P5001 3
Q16 (P.B L :OFF)
Q9 (REC H :ON)
SS HEAD R' P5002 7
SS(STILL/SEARCH) R' HEAD
Q10 (REC H :ON)
P5002 8
SS HEAD P.B L
P5001 4
Q17 (SS P.B L :OFF)
SS HEAD R'' P5002 12
SS(STILL/SEARCH) R'' HEAD
P5002 11
Q13 (REC H :ON)
TP2
PLAY .035Vp-p(V)
PLAY 4.2Vp-p(V)
AMP
ENV. DET
HEAD SW
H.A SV
IC1 (AN3311K)
P5003 3 HEAD SW
P5001 5 SS H
P5003 1 P.B RF OUT
Q11,Q12 BUFFER
Q25
L12, C64,C65 COLOR TRAP
P5001 6 REC/PLAY H
D1 (REC/PLAY H :OFF)
+5V
MINANCE
P5004 4 P.B C OUT
Q14 BUFFER
FL1 L.P.F 1.5MHz
Q15 BUFFER
P5001 7 AUDIO DUB L
+12V
Q26 (AUDIO DUB L :OFF)
Q27 (EXCEPT AUDIO DUB L :ON)
LUMINANCE RECORDING SIGNAL PATH
LUMINANCE E-E SIGNAL PATH
LUMINANCE PLAYBACK SIGNAL PATH

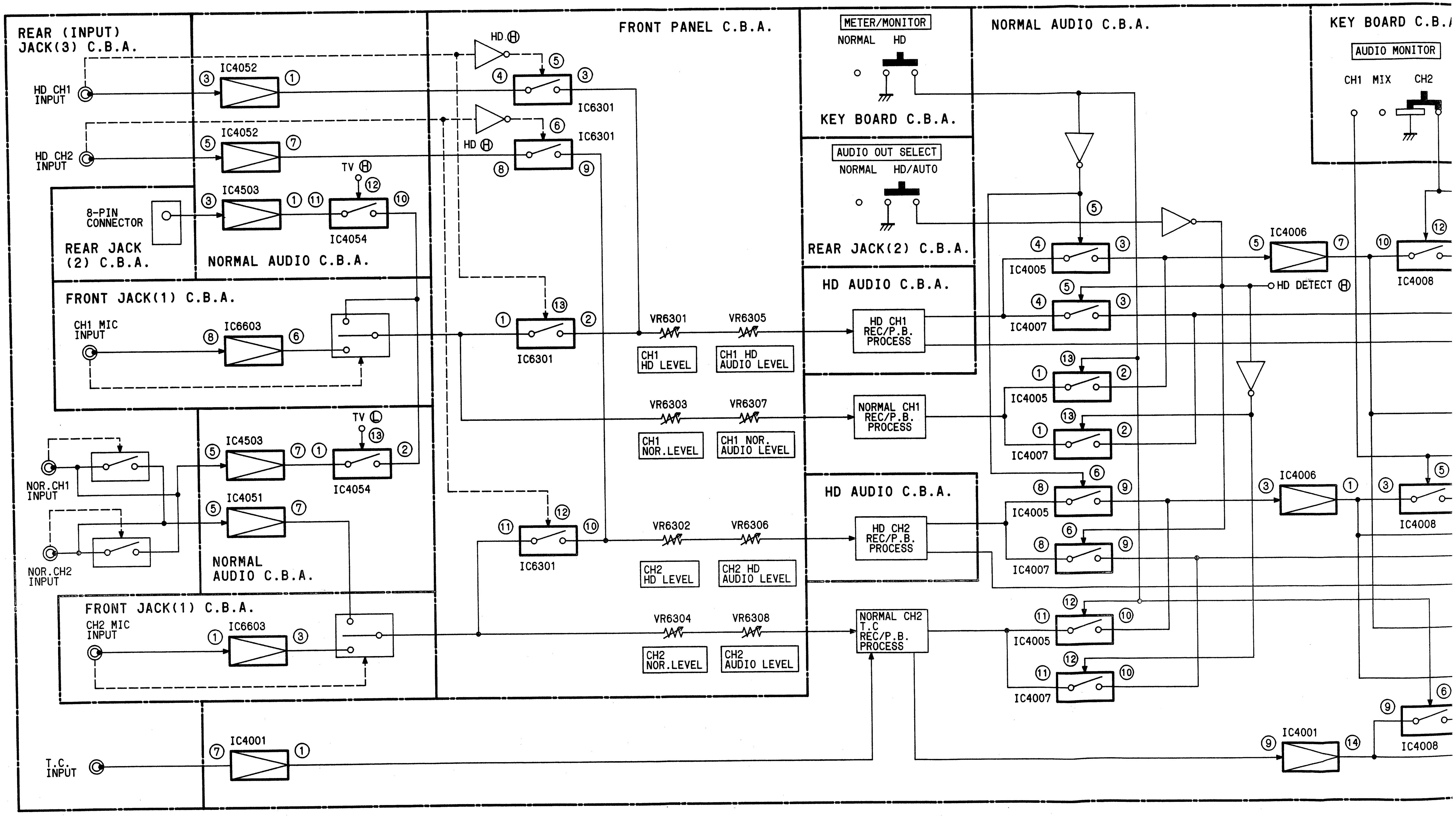
CHROMINANCE BLOCK DIAGRAM

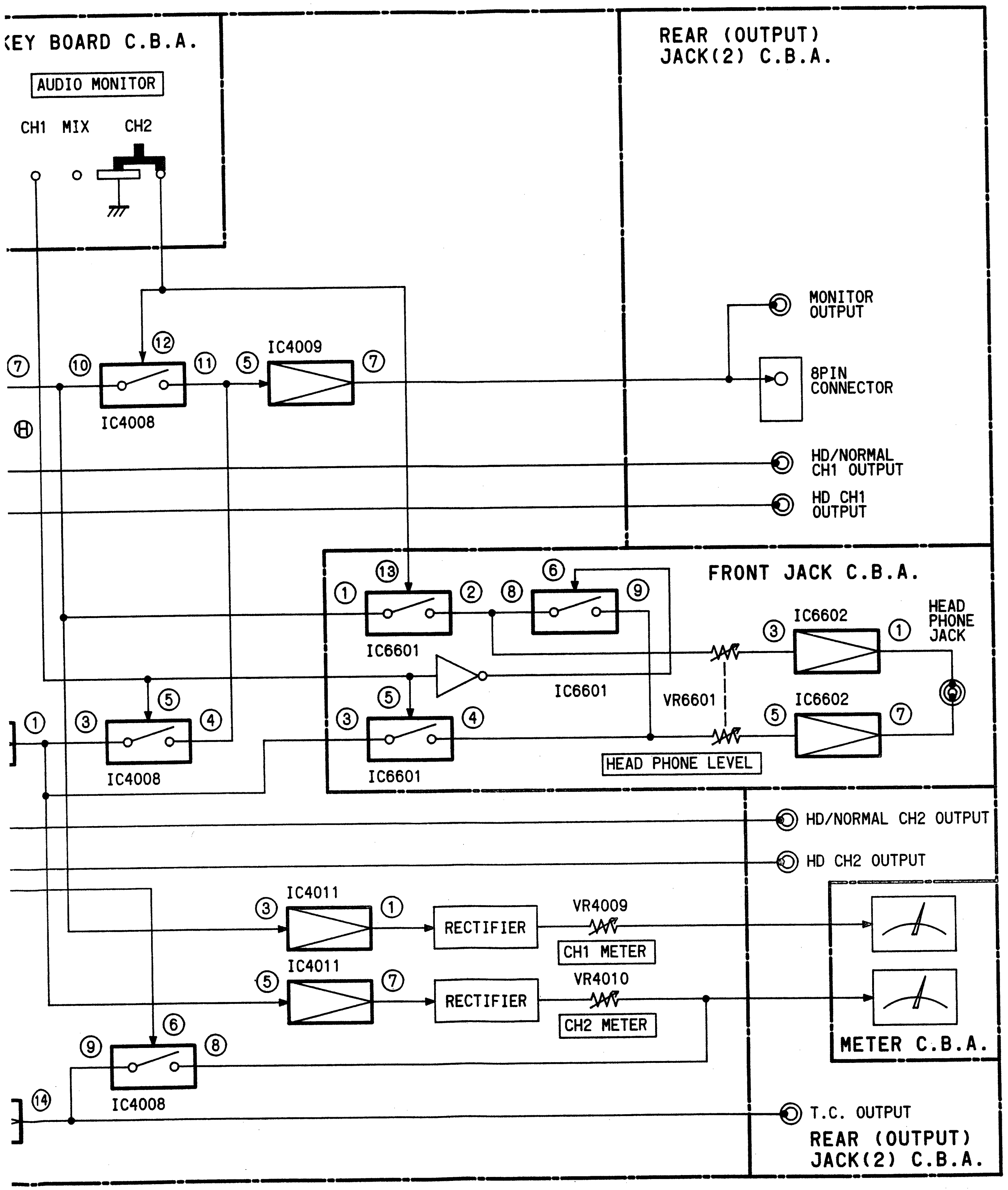

4.43MHz
REC 90mVp-p(H)
IC1 (AN6367)
FROM LUMINANCE
P8001 1 SWD VIDEO
Q1 AMP
FL1 B.P.F
ACC DET
IC2 (MN6163A)
REC 4.2Vp-p(V)
REC
1/2
1/321
AFC PHASE COMPARATOR
REC VCO
VR8001
+5V
FROM LUMINANCE
P8002 6 HEAD SW
1/4 RING COUNTER
0° 90° 180° 270°
3.2μ SEC MMV
X'TAL VCO (4.43MHz)
REC 4.8Vp-p
PHASE ROTATION
1/4 RING COUNTER
DIGITAL PLL
45μ SEC MMV
BURST GATE PULSE GENERATOR
V-GATE
COLOUR H
P8006 1
REC 4.8Vp-p(H)
FROM LUMINANCE
P8001 5 REC HSS
X1 4.43MHz
TP4
REC 4Vp-p(H)
REC 0.64Vp-p
TP10
DUB IN CONNECTOR
P6418-P8004 2 DUB C IN
P6418-P8004 1 DUB H.SW IN
DUB OV IN
REAR(INPUT)JACK(3) C.B.A. (VEP00G67A)
TO LUMINANCE
P3002-P6416 3
P3002-P6416 5 DUB Y IN
P.B. 100mVp-p(H)
REC 0.32Vp-p(H)
IC7 (BA7001)
E-E L
E-E 627KHz C
PB 627KHz C
Q9
Q10
Q11 AMP
Q24 AMP
DL2 DELAY LINE
C98
FL3 B.P.F.
4.43MHz
FROM HEAD AMP
P8003 4 PB C IN
Q21 AMP
TO SERVO
P8006 4
TO COLOUR FRAMING
P8009 1 REC PHASE
IC9 (AN608P) AMP
P.B. 80mVp-p(H)
REC 260mVp-p(H)
FL4 B.P.F. 5.06MHz
5.06MHz
TO LUMINANCE
P8002 4 PB Y
Q22
VR8004 DG CORRECTION
PB VCO
VR8002
ACC
FSI
1/2
P.B.
DET
FREQUENCY DETECTOR
3.2μ SEC MMV
X'TAL O (4.43MH
TO SERVO
P8006 3 AND DUB H
P.B 4.8Vp-p
P.B. 0.48Vp-p(H)
IC4 (MN6163A)
FROM LUMINANCE
P8001 7 EE L
FROM LUMINANCE
P8001 3 AND DUB H
FROM LUMINANCE
P8002 7 P.B. HSS
EE L D4
AND DUB H D3
IC5 (BA7001)
REC 5.06MHz
PB.E-E 5.06MHz
5.06MHz
P.B. 3.5Vp-p(H)
0.8Vp-p
P.B 4.8Vp-p(V)
P.B. 0.8Vp-p
TO COLOUR FRAMING
P8009 3 PB PHASE
Q12,Q25 BUFFER
TP9
TO SERVO
P8006 1 REF 4.43MHz
Q13 AMP


RECORDING SIGNAL PATH
PLAYBACK (EE) SIGNAL PATH
IC1 (AN6367)
REC MAIN BALANCE MODULATOR
REC AMP
ACC
ACC DETECT
KILLER PAUSE COMPARATOR
90°PHASE SHIFTER
X'TAL VCO (4.43MHz)
APC COMPARATOR
VCO (5.02MHz)
SUB BALANCE MODULATOR
AFC PHASE COMPARATOR
3.2μ SEC MMV
DIGITAL PLL
45μ SEC MMV
V-GATE
REC VCO
VR8001
X1 4.43MHz
FL2 B.P.F 5.06MHz
TP4
TP2
REC 4Vp-p(H)
REC 0.64Vp-p
REC 0.35Vp-p(H)
REC 90mVp-p(H)
4.43MHz
5.06MHz
Q6 BUFFER
Q17 AMP
FL5 L.P.F.
1.5MHz
REC 0.9Vp-p(H)
C.REC CURR
VR8003
Q18 BUFFER
DL1 DELAY LINE
Q19 AMP
REC 627KHz C
Q16 (EE:ON)
FL6 L.P.F. 1MHz
Q27 AMP
CHROMA EE
Q2 (REC COLOUR:ON)
Q26 (AND DUB:ON)
Q29 (AND DUB:OFF)
QR5 (AND DUB:ON)
QR1 (COLOUR:ON)
D1
D2
REC 220mVp-p(H)
IC6 (μPD4053BC)
NOR REC
AND DUB
REC 627KHz C OR DUB 627KHz C
REC COLOUR
EXC REC COLOUR
Q20 BUFFER
REC 160mVp-p(H)
REC C OUT
P8003 1
TO HEAD AMP
QR3 (REC COLOUR/OFF)
QR4 (E-E/OFF)
P6417-P3004 7
FROM LUMINANCE
DUB CONNECTOR
DUB Y OUT
DUB H.SW OUT
DUB C OUT
DUB OV OUT
P8005-P6419 1
P8005-P6419 2
P6417-P3004 5
REAR(OUTPUT) JACK(2) C.B.A. (VEPOOF79A)
P.B. 1.0Vp-p(H)
Q37 AMP
Q36 (PB COLOUR:OFF)
Q9
Q10
Q11 AMP
IC7 (BA7001)
Q24 AMP
DL2 DELAY LINE
C98
FL3 B.P.F.
Q7 AMP
Q27 AMP
DL3 DELAY LINE
DL4 DELAY LINE
Q28 BUFFER
DUB 627KHz C
VR8005
DUB C REC CURRENT
Q30 AMP
DL5 DELAY LINE
Q31 BUFFER
PB.E-E 627KHz C
C32
IC3 (AN6367)
P.B. MAIN BALANCE MODULATOR
P.B. AMP
KILLER PHASE COMPARATOR
FREQUENCY DETECTOR
DET
1/2
1/4 RING COUNTER
PB VCO
VR8002
P.B. 80mVp-p(H)
REC 260mVp-p(H)
FL4 B.P.F. 5.06MHz
Q35 AMP
VR8006
DUB C PB OUT LEVEL
Q8 (PB COLOUR:ON)
P.B. 2.1Vp-p(H)
TP12
Q39 BUFFER
IC8 (AN608P)
P.B C OUT
P8002 1
TO LUMINANCE
H.SW
QR7
Q34 BUFFER
QR2 (COLOUR(H),REC,EE:ON)
Q36 BUFFER
DL7 2H DELAY LINE
PB 4.43MHz C
QR12 (SS:ON)
QR11
PB HEAD SW
HEAD SW
Q33
QR6
QR8
QR9 (SS/ON)
SS
P8001 6
FROM LUMINANCE
TP8
TP7
P.B 4.8Vp-p(V)
P.B. 0.8Vp-p
P.B. 0.6Vp-p
Q15 AMP
Q14 4.43MHz OSC
X2
C70
Q13 AMP
5.06MHz

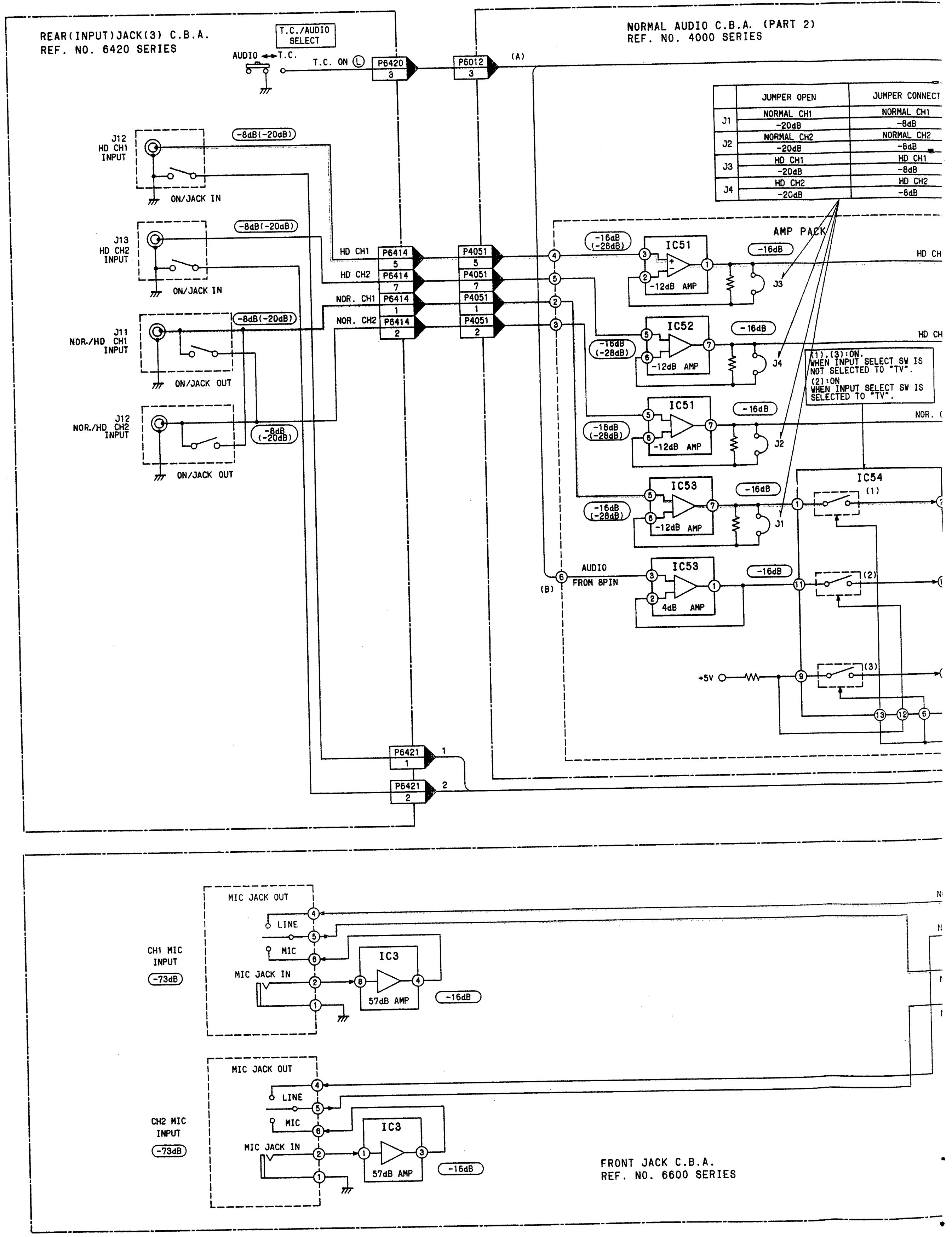
REF.NO. 8000 SERIES

AUDIO OVERALL BLOCK DIAGRAM

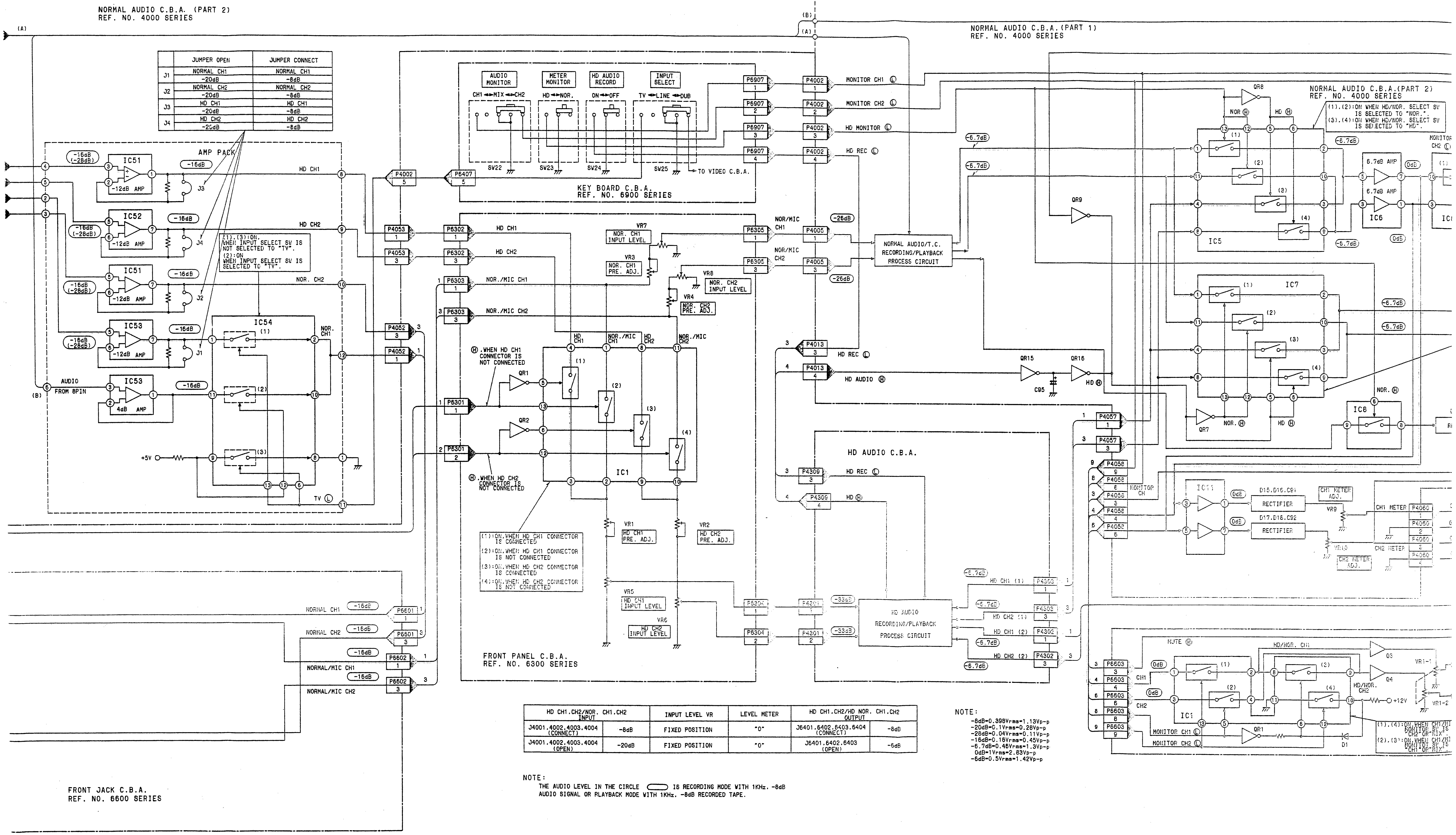

REAR (INPUT) JACK(3) C.B.A.
HD CH1 INPUT
HD CH2 INPUT
IC4052
IC4052
IC4503
IC4054
TV Ⓗ
8-PIN CONNECTOR
REAR JACK (2) C.B.A.
NORMAL AUDIO C.B.A.
FRONT JACK(1) C.B.A.
CH1 MIC INPUT
IC6603
NOR.CH1 INPUT
NOR.CH2 INPUT
IC4503
IC4054
TV Ⓛ
IC4051
NORMAL AUDIO C.B.A.
FRONT JACK(1) C.B.A.
CH2 MIC INPUT
IC6603
T.C. INPUT
IC4001
FRONT PANEL C.B.A.
HD Ⓗ
HD Ⓗ
IC6301
IC6301
IC6301
IC6301
VR6301
CH1 HD LEVEL
VR6305
CH1 HD AUDIO LEVEL
VR6303
CH1 NOR.LEVEL
VR6307
CH1 NOR. AUDIO LEVEL
VR6302
CH2 HD LEVEL
VR6306
CH2 HD AUDIO LEVEL
VR6304
CH2 NOR.LEVEL
VR6308
CH2 AUDIO LEVEL
METER/MONITOR
NORMAL
HD
KEY BOARD C.B.A.
AUDIO OUT SELECT
NORMAL
HD/AUTO
REAR JACK(2) C.B.A.
HD AUDIO C.B.A.
HD CH1 REC/P.B. PROCESS
NORMAL CH1 REC/P.B. PROCESS
HD AUDIO C.B.A.
HD CH2 REC/P.B. PROCESS
NORMAL CH2 T.C REC/P.B. PROCESS
NORMAL AUDIO C.B.A.
IC4005
IC4007
IC4005
IC4007
IC4005
IC4007
IC4005
IC4007
IC4006
IC4006
HD DETECT Ⓗ
IC4001
KEY BOARD C.B.A
AUDIO MONITOR
CH1
MIX
CH2
IC4008
IC4008
IC4008


KEY BOARD C.B.A.
AUDIO MONITOR
CH1
MIX
CH2
REAR (OUTPUT) JACK(2) C.B.A.
MONITOR OUTPUT
8PIN CONNECTOR
HD/NORMAL CH1 OUTPUT
HD CH1 OUTPUT
IC4009
IC4008
⑦
⑩
⑪
⑫
⑤
Ⓗ
FRONT JACK C.B.A.
IC6601
IC6602
HEAD PHONE JACK
VR6601
HEAD PHONE LEVEL
⑬
①
②
⑧
⑥
⑨
③
④
HD/NORMAL CH2 OUTPUT
HD CH2 OUTPUT
IC4011
RECTIFIER
VR4009
CH1 METER
VR4010
CH2 METER
METER C.B.A.
⑭
T.C. OUTPUT
REAR (OUTPUT) JACK(2) C.B.A.

AUDIO CONTROL BLOCK DIAGRAM


REAR(INPUT)JACK(3) C.B.A.
REF. NO. 6420 SERIES
T.C./AUDIO SELECT
AUDIO ◄►T.C.
T.C. ON Ⓛ
P6420
P6012
(A)
NORMAL AUDIO C.B.A. (PART 2)
REF. NO. 4000 SERIES
J12 HD CH1 INPUT
J13 HD CH2 INPUT
J11 NOR./HD CH1 INPUT
J12 NOR./HD CH2 INPUT
ON/JACK IN
ON/JACK OUT
-8dB(-20dB)
HD CH1
HD CH2
NOR. CH1
NOR. CH2
P6414
P4051
P6421
AMP PACK
IC51
IC52
IC53
IC54
-16dB (-28dB)
-16dB
-12dB AMP
4dB AMP
J1
J2
J3
J4
(1),(3):ON, WHEN INPUT SELECT SW IS NOT SELECTED TO "TV".
(2):ON WHEN INPUT SELECT SW IS SELECTED TO "TV".
AUDIO FROM 8PIN
(B)
+5V
HD CH
NOR.
MIC JACK OUT
LINE
MIC
MIC JACK IN
CH1 MIC INPUT
CH2 MIC INPUT
-73dB
IC3
57dB AMP
FRONT JACK C.B.A.
REF. NO. 6600 SERIES

	JUMPER OPEN	JUMPER CONNECT
J1	NORMAL CH1 -20dB	NORMAL CH1 -8dB
J2	NORMAL CH2 -20dB	NORMAL CH2 -8dB
J3	HD CH1 -20dB	HD CH1 -8dB
J4	HD CH2 -20dB	HD CH2 -8dB

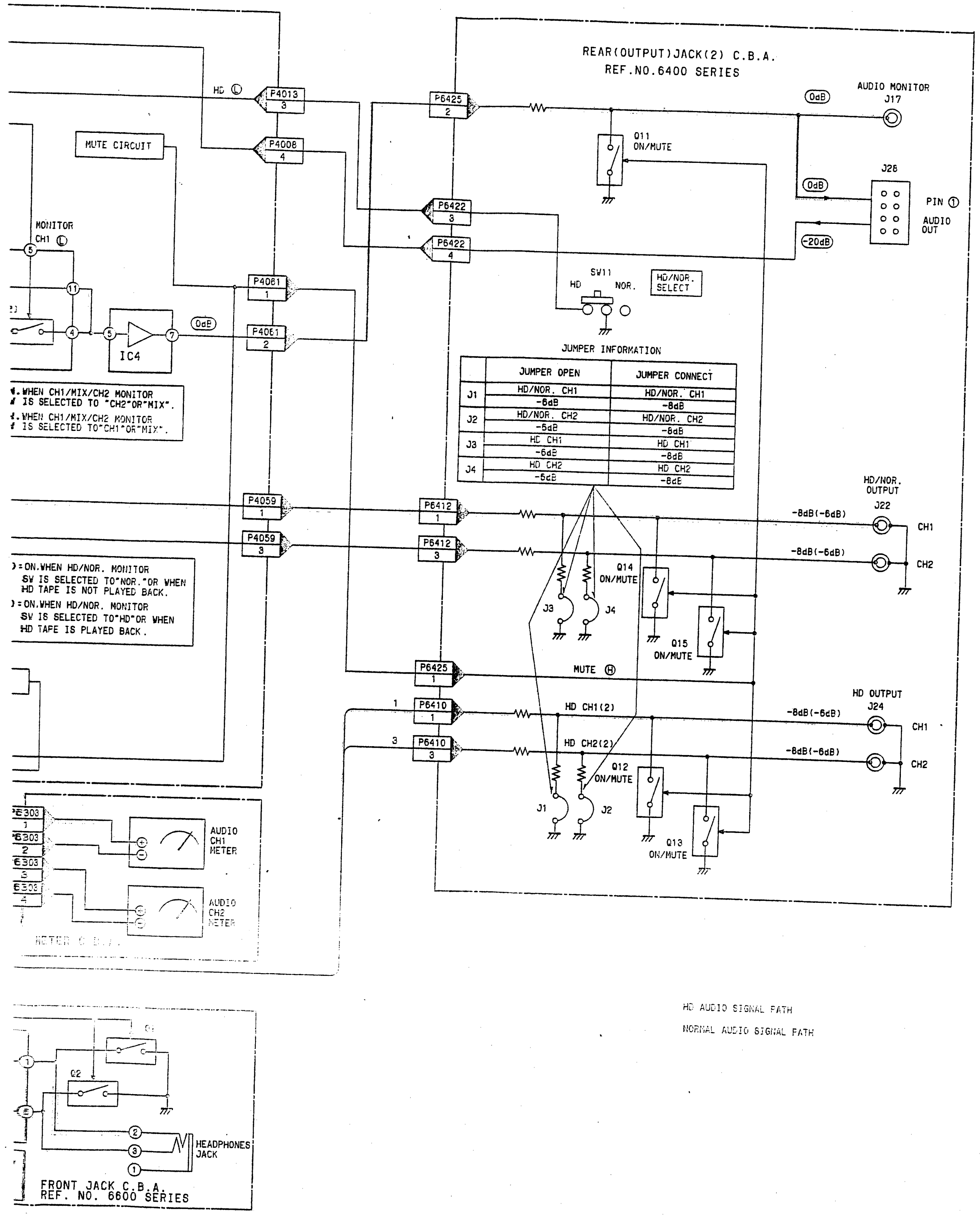

NORMAL AUDIO C.B.A. (PART 2)
REF. NO. 4000 SERIES
NORMAL AUDIO C.B.A.(PART 1)
REF. NO. 4000 SERIES
NORMAL AUDIO C.B.A.(PART 2)
REF. NO. 4000 SERIES
KEY BOARD C.B.A.
REF. NO. 6900 SERIES
FRONT PANEL C.B.A.
REF. NO. 6300 SERIES
HD AUDIO C.B.A.
FRONT JACK C.B.A.
REF. NO. 6600 SERIES
AMP PACK
IC51
IC52
IC53
IC54
IC1
IC5
IC6
IC7
IC8
IC11
-12dB AMP
4dB AMP
6.7dB AMP
AUDIO FROM 8PIN
HD CH1
HD CH2
NOR. CH2
NOR. CH1
TV Ⓛ
+5V
J1
J2
J3
J4
AUDIO MONITOR
CH1 ◄►MIX◄►CH2
METER MONITOR
HD◄►NOR.
HD AUDIO RECORD
ON◄►OFF
INPUT SELECT
TV ◄►LINE ◄►DUB
SV22
SV23
SV24
SV25
TO VIDEO C.B.A.
MONITOR CH1 Ⓛ
MONITOR CH2 Ⓛ
HD MONITOR Ⓛ
HD REC Ⓛ
HD AUDIO Ⓗ
HD Ⓗ
NOR Ⓗ
NOR/MIC CH1
NOR/MIC CH2
NOR./MIC CH1
NOR./MIC CH2
NORMAL AUDIO/T.C. RECORDING/PLAYBACK PROCESS CIRCUIT
HD AUDIO RECORDING/PLAYBACK PROCESS CIRCUIT
VR1 HD CH1 PRE. ADJ.
VR2 HD CH2 PRE. ADJ.
VR3 NOR. CH1 PRE. ADJ.
VR4 NOR. CH2 PRE. ADJ.
VR5 HD CH1 INPUT LEVEL
VR6 HD CH2 INPUT LEVEL
VR7 NOR. CH1 INPUT LEVEL
VR8 NOR. CH2 INPUT LEVEL
VR9 CH1 METER ADJ.
VR10 CH2 METER ADJ.
CH1 METER
CH2 METER
D15.D16.C91 RECTIFIER
D17.D18.C92 RECTIFIER
MONITOR CH
QR1
QR2
QR7
QR8
QR9
QR15
QR16
C95
Q3
Q4
VR1-1
VR1-2
D1
+12V
MUTE Ⓗ
HD/NOR. CH1
HD/NOR. CH2
MONITOR CH1 Ⓛ
MONITOR CH2 Ⓛ
HD CH1 (1)
HD CH2 (1)
HD CH1 (2)
HD CH2 (2)
NORMAL CH1
NORMAL CH2
NORMAL/MIC CH1
NORMAL/MIC CH2
P4002
P6407
P6907
P4053
P4052
P6302
P6303
P6301
P6305
P6304
P4005
P4013
P4057
P4058
P4309
P4301
P4302
P4303
P4060
P6601
P6602
P6603
-16dB
(-28dB)
-26dB
-33dB
-6.7dB
0dB
Ⓗ.WHEN HD CH1 CONNECTOR IS NOT CONNECTED
Ⓗ.WHEN HD CH2 CONNECTOR IS NOT CONNECTED
(1).(3):ON.
WHEN INPUT SELECT SW IS NOT SELECTED TO "TV".
(2):ON
WHEN INPUT SELECT SW IS SELECTED TO "TV".
(1):ON.WHEN HD CH1 CONNECTOR IS CONNECTED
(2):ON.WHEN HD CH1 CONNECTOR IS NOT CONNECTED
(3):ON.WHEN HD CH2 CONNECTOR IS CONNECTED
(4):ON.WHEN HD CH2 CONNECTOR IS NOT CONNECTED
(1).(2):ON WHEN HD/NOR. SELECT SW IS SELECTED TO "NOR.".
(3).(4):ON WHEN HD/NOR. SELECT SW IS SELECTED TO "HD".
(A)
(B)

	JUMPER OPEN	JUMPER CONNECT
J1	NORMAL CH1	NORMAL CH1
	-20dB	-8dB
J2	NORMAL CH2	NORMAL CH2
	-20dB	-8dB
J3	HD CH1	HD CH1
	-20dB	-8dB
J4	HD CH2	HD CH2
	-20dB	-8dB

HD CH1.CH2/NOR. CH1.CH2 INPUT		INPUT LEVEL VR	LEVEL METER	HD CH1.CH2/HD NOR. CH1.CH2 OUTPUT	
J4001.4002.4003.4004 (CONNECT)	-8dB	FIXED POSITION	"0"	J6401.6402.6403.6404 (CONNECT)	-8dB
J4001.4002.4003.4004 (OPEN)	-20dB	FIXED POSITION	"0"	J6401.6402.6403 (OPEN)	-6dB

NOTE:
-8dB=0.398Vrms=1.13Vp-p
-20dB=0.1Vrms=0.28Vp-p
-28dB=0.04Vrms=0.11Vp-p
-16dB=0.16Vrms=0.45Vp-p
-6.7dB=0.46Vrms=1.3Vp-p
0dB=1Vrms=2.83Vp-p
-6dB=0.5Vrms=1.42Vp-p

NOTE:
THE AUDIO LEVEL IN THE CIRCLE ⬭ IS RECORDING MODE WITH 1KHz. -8dB AUDIO SIGNAL OR PLAYBACK MODE WITH 1KHz. -8dB RECORDED TAPE.


REAR(OUTPUT)JACK(2) C.B.A.
REF.NO.6400 SERIES
HD ⓛ
P4013 3
P4008 4
MUTE CIRCUIT
MONITOR
CH1 ⓛ
IC4
0dB
P4061 1
P4061 2
P6425 2
P6422 3
P6422 4
Q11
ON/MUTE
AUDIO MONITOR
J17
0dB
0dB
-20dB
J26
PIN ①
AUDIO
OUT
SW11
HD
NOR.
HD/NOR.
SELECT
JUMPER INFORMATION
•. WHEN CH1/MIX/CH2 MONITOR
IS SELECTED TO "CH2" OR "MIX".
•. WHEN CH1/MIX/CH2 MONITOR
IS SELECTED TO "CH1" OR "MIX".
P4059 1
P4059 3
P6412 1
P6412 3
=ON. WHEN HD/NOR. MONITOR
SW IS SELECTED TO "NOR." OR WHEN
HD TAPE IS NOT PLAYED BACK.
=ON. WHEN HD/NOR. MONITOR
SW IS SELECTED TO "HD" OR WHEN
HD TAPE IS PLAYED BACK.
HD/NOR.
OUTPUT
J22
-8dB(-6dB)
-8dB(-6dB)
CH1
CH2
Q14
ON/MUTE
J3
J4
Q15
ON/MUTE
P6425 1
MUTE Ⓗ
1
P6410 1
3
P6410 3
HD CH1(2)
HD CH2(2)
HD OUTPUT
J24
-8dB(-6dB)
-8dB(-6dB)
CH1
CH2
Q12
ON/MUTE
J1
J2
Q13
ON/MUTE
6303 1
6303 2
6303 3
6303 4
AUDIO
CH1
METER
AUDIO
CH2
METER
METER C.B.A.
Q1
Q2
HEADPHONES
JACK
FRONT JACK C.B.A.
REF. NO. 6600 SERIES

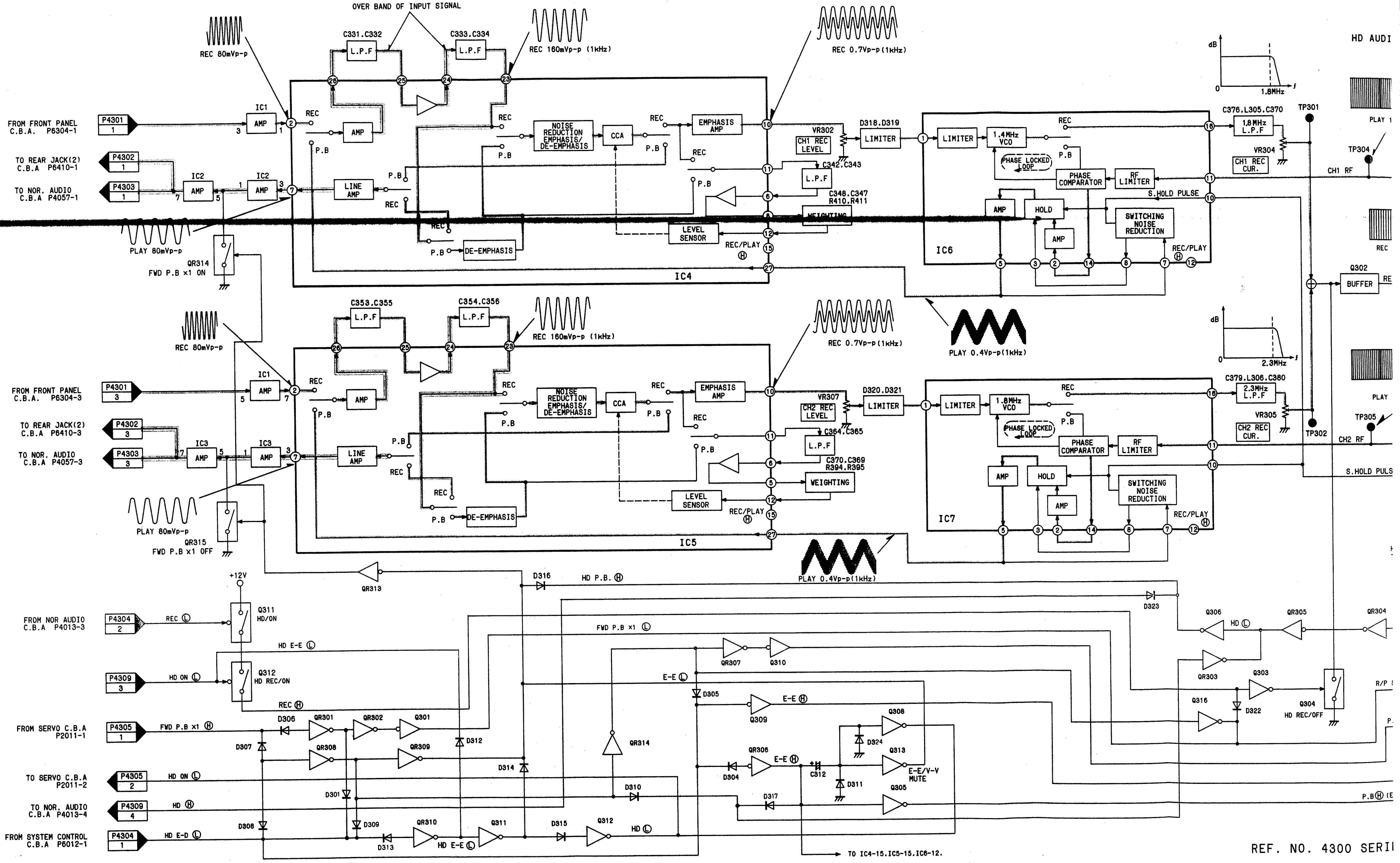
JUMPER INFORMATION

	JUMPER OPEN	JUMPER CONNECT
J1	HD/NOR. CH1 -6dB	HD/NOR. CH1 -8dB
J2	HD/NOR. CH2 -6dB	HD/NOR. CH2 -8dB
J3	HD CH1 -6dB	HD CH1 -8dB
J4	HD CH2 -6dB	HD CH2 -8dB

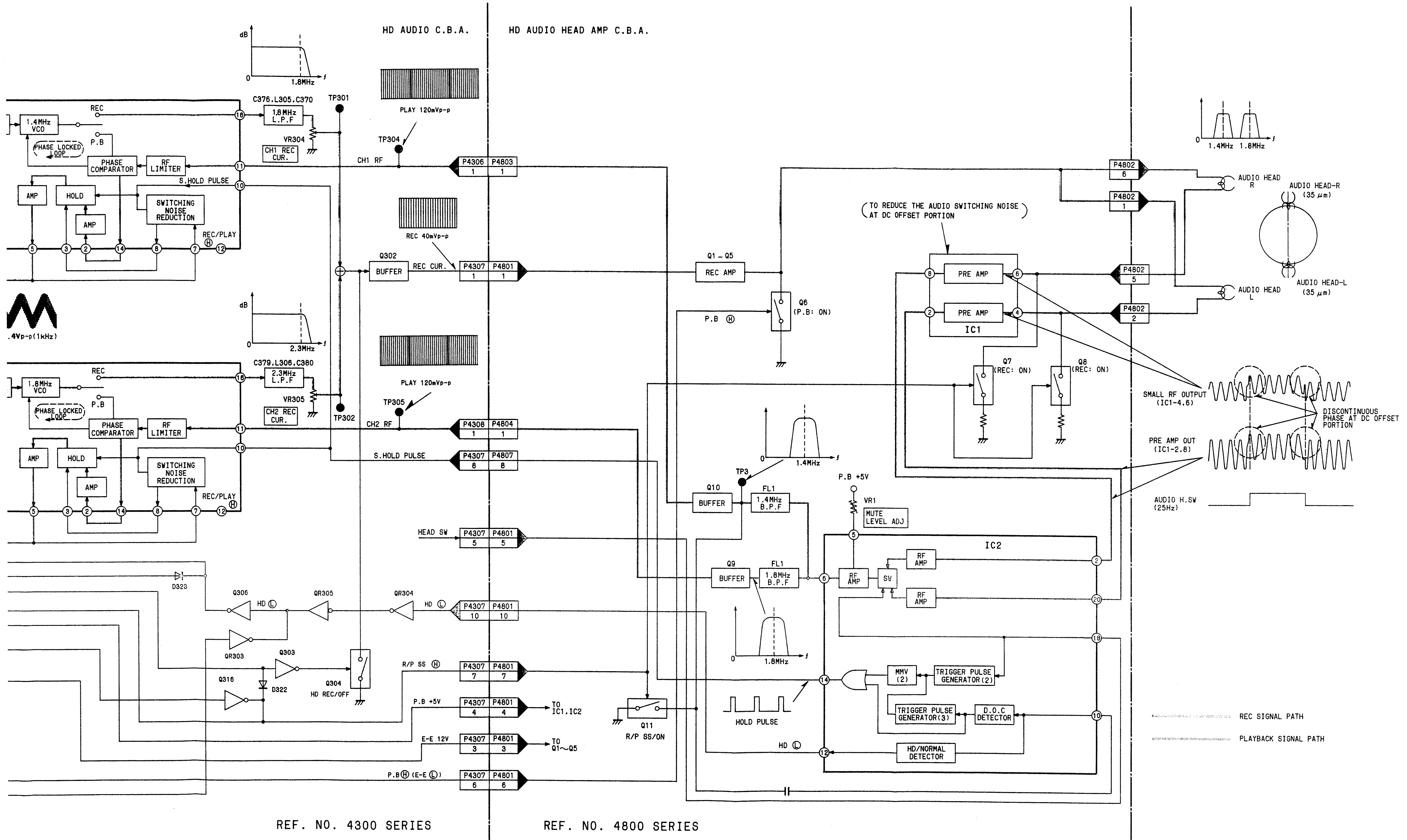
HD AUDIO SIGNAL PATH

NORMAL AUDIO SIGNAL PATH

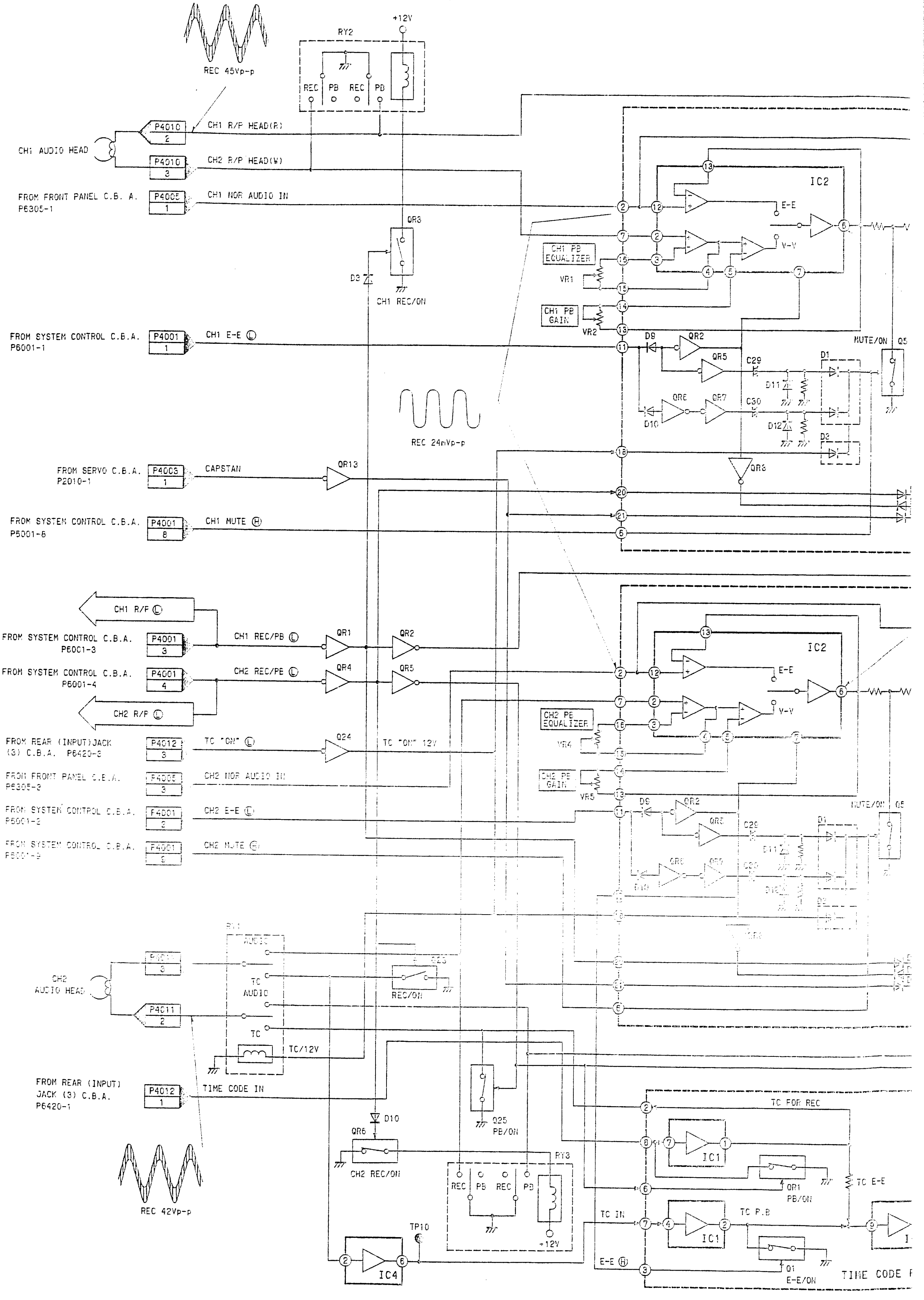
HD AUDIO BLOCK DIAGRAM

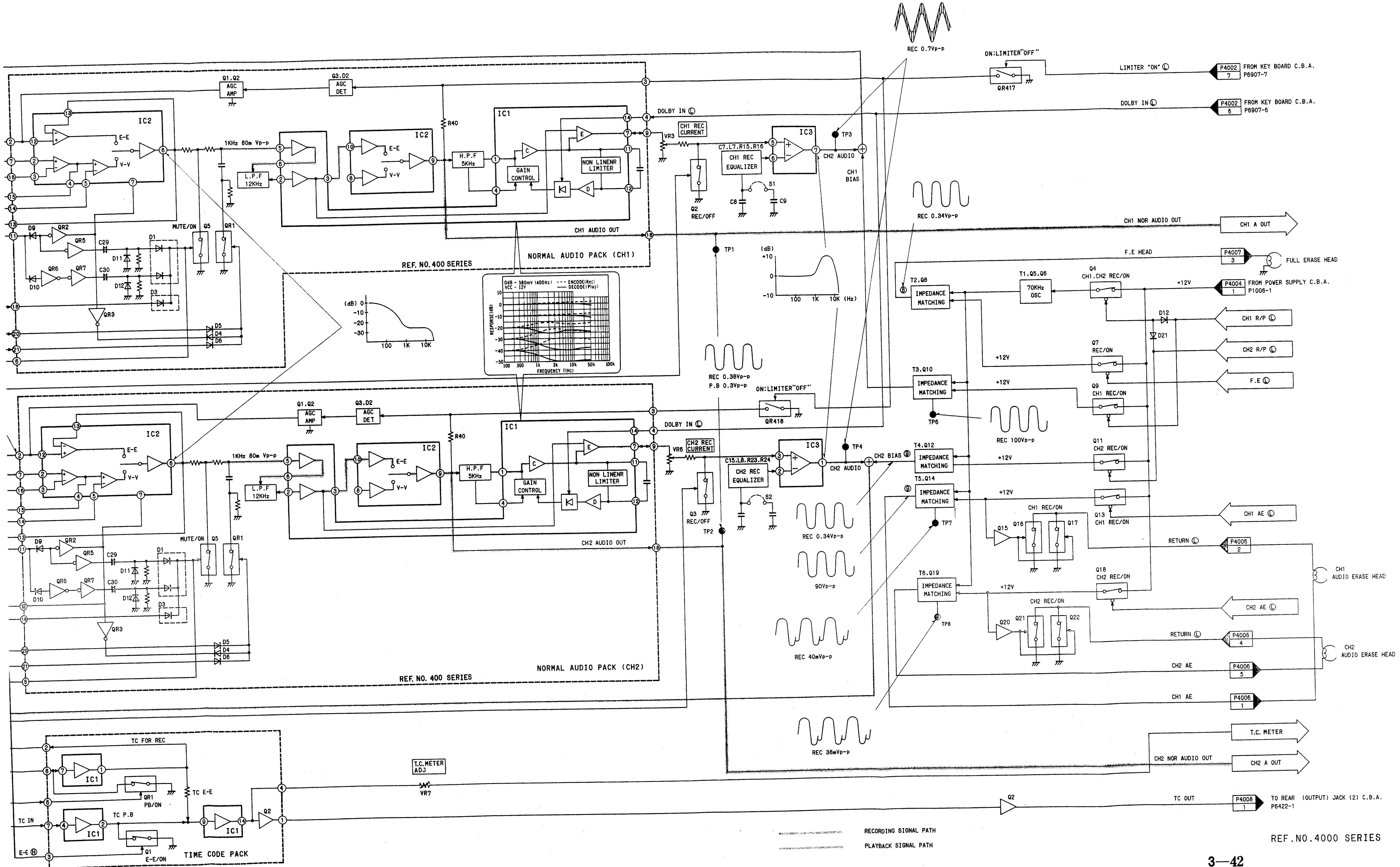

REMOVE THE NOISE COMPONENT THAT IS OVER BAND OF INPUT SIGNAL
REC 80mVp-p
C331.C332
L.P.F
C333.C334
REC 160mVp-p (1kHz)
REC 0.7Vp-p(1kHz)
FROM FRONT PANEL C.B.A. P6304-1
P4301
TO REAR JACK(2) C.B.A P6410-1
P4302
TO NOR. AUDIO C.B.A P4057-1
P4303
IC1
IC2
AMP
LINE AMP
REC
P.B
NOISE REDUCTION EMPHASIS/ DE-EMPHASIS
CCA
EMPHASIS AMP
VR302
CH1 REC LEVEL
D318.D319
LIMITER
C342.C343
C348.C347
R410.R411
WEIGHTING
LEVEL SENSOR
DE-EMPHASIS
REC/PLAY Ⓗ
IC4
PLAY 80mVp-p
QR314
FWD P.B ×1 ON
1.4MHz VCO
PHASE LOCKED LOOP
PHASE COMPARATOR
RF LIMITER
S.HOLD PULSE
HOLD
SWITCHING NOISE REDUCTION
IC6
dB
1.8MHz
C376.L305.C370
1.8MHz L.P.F
VR304
CH1 REC CUR.
TP301
TP304
CH1 RF
Q302
BUFFER
PLAY 0.4Vp-p(1kHz)
C353.C355
C354.C356
FROM FRONT PANEL C.B.A. P6304-3
TO REAR JACK(2) C.B.A P6410-3
TO NOR. AUDIO C.B.A P4057-3
IC3
VR307
CH2 REC LEVEL
D320.D321
C364.C365
C370.C369
R394.R395
IC5
QR315
FWD P.B ×1 OFF
1.8MHz VCO
IC7
2.3MHz
C379.L306.C380
2.3MHz L.P.F
VR305
CH2 REC CUR.
TP305
TP302
CH2 RF
S.HOLD PULS
+12V
QR313
D316
HD P.B. Ⓗ
D323
FROM NOR AUDIO C.B.A P4013-3
P4304
REC Ⓛ
Q311 HD/ON
HD E-E Ⓛ
FWD P.B ×1 Ⓛ
P4309
HD ON Ⓛ
Q312 HD REC/ON
REC Ⓗ
E-E Ⓛ
QR307
Q310
D305
E-E Ⓗ
QR309
Q306
HD Ⓛ
QR305
QR304
QR303
Q303
Q316
D322
Q304 HD REC/OFF
R/P
FROM SERVO C.B.A P2011-1
P4305
FWD P.B ×1 Ⓗ
D306
QR301
QR302
Q301
D307
QR308
QR309
D312
QR314
QR306
E-E Ⓗ
Q308
D324
Q313
E-E/V-V MUTE
C312
D304
D311
Q305
TO SERVO C.B.A P2011-2
HD ON Ⓛ
D314
D310
TO NOR. AUDIO C.B.A P4013-4
HD Ⓗ
D301
D317
P.B Ⓗ
FROM SYSTEM CONTROL C.B.A P6012-1
HD E-D Ⓛ
D308
D309
QR310
Q311
D315
Q312
HD Ⓛ
D313
HD E-E Ⓛ
TO IC4-15.IC5-15.IC6-12.

REF. NO. 4300 SERI


HD AUDIO C.B.A.
HD AUDIO HEAD AMP C.B.A.
dB
1.8MHz
C376.L305.C370
TP301
1.8MHz L.P.F
VR304
CH1 REC CUR.
1.4MHz VCO
REC
P.B
PHASE LOCKED LOOP
PHASE COMPARATOR
RF LIMITER
S.HOLD PULSE
AMP
HOLD
SWITCHING NOISE REDUCTION
REC/PLAY Ⓗ
PLAY 120mVp-p
TP304
CH1 RF
P4306 P4803
REC 40mVp-p
Q302
BUFFER
REC CUR.
P4307 P4801
.4Vp-p(1kHz)
2.3MHz
C379.L306.C380
2.3MHz L.P.F
VR305
CH2 REC CUR.
TP302
1.8MHz VCO
TP305
CH2 RF
P4308 P4804
P4307 P4807
HEAD SW
D323
Q306
QR305
QR304
HD Ⓛ
QR303
Q303
Q316
D322
Q304
HD REC/OFF
R/P SS Ⓗ
P.B +5V
TO IC1.IC2
E-E 12V
TO Q1~Q5
P.BⒽ (E-E Ⓛ)
Q1 ~ Q5
REC AMP
Q6 (P.B: ON)
P.B Ⓗ
TP3
1.4MHz
FL1
1.4MHz B.P.F
Q10
BUFFER
P.B +5V
VR1
MUTE LEVEL ADJ
Q9
1.8MHz B.P.F
1.8MHz
IC2
RF AMP
SW
MMV (2)
TRIGGER PULSE GENERATOR(2)
TRIGGER PULSE GENERATOR(3)
D.O.C DETECTOR
HD/NORMAL DETECTOR
HOLD PULSE
Q11
R/P SS/ON
TO REDUCE THE AUDIO SWITCHING NOISE AT DC OFFSET PORTION
PRE AMP
IC1
Q7 (REC: ON)
Q8 (REC: ON)
P4802
1.4MHz 1.8MHz
AUDIO HEAD R
AUDIO HEAD-R (35 μm)
AUDIO HEAD L
AUDIO HEAD-L (35 μm)
SMALL RF OUTPUT (IC1-4,6)
DISCONTINUOUS PHASE AT DC OFFSET PORTION
PRE AMP OUT (IC1-2,8)
AUDIO H.SW (25Hz)
REC SIGNAL PATH
PLAYBACK SIGNAL PATH
REF. NO. 4300 SERIES
REF. NO. 4800 SERIES

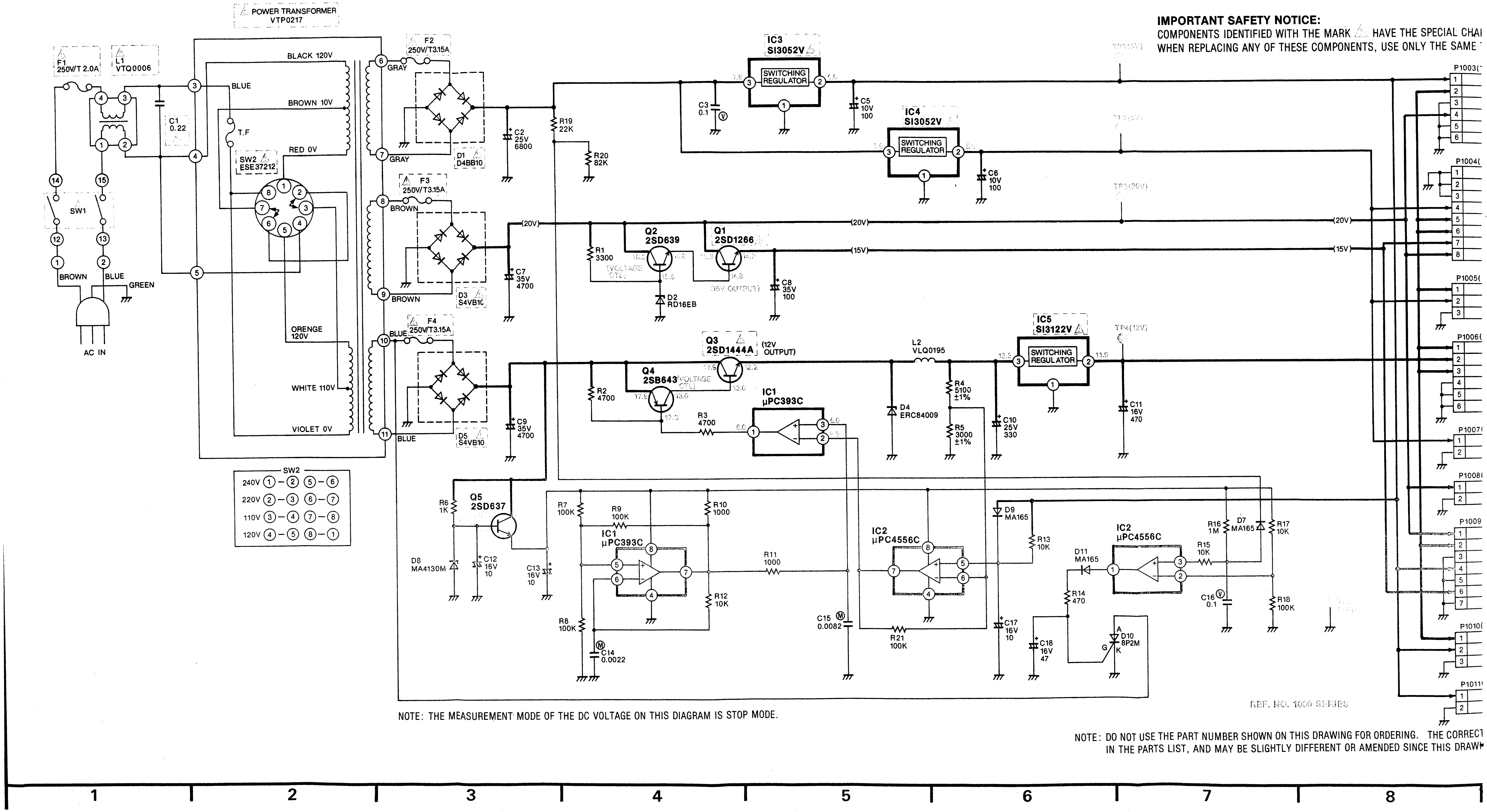
NORMAL AUDIO BLOCK DIAGRAM


REC 45Vp-p
RY2
+12V
REC
PB
REC
PB
P4010
2
CH1 R/P HEAD(R)
CH1 AUDIO HEAD
P4010
3
CH2 R/P HEAD(W)
FROM FRONT PANEL C.B. A.
P6305-1
P4005
1
CH1 NOR AUDIO IN
QR3
D3
CH1 REC/ON
FROM SYSTEM CONTROL C.B.A.
P6001-1
P4001
1
CH1 E-E Ⓛ
IC2
E-E
V-V
CH1 PB EQUALIZER
VR1
CH1 PB GAIN
VR2
D9
QR2
QR5
C29
D11
QR6
QR7
C30
D10
D12
D1
D2
MUTE/ON
Q5
QR8
REC 24mVp-p
FROM SERVO C.B.A.
P2010-1
P4003
1
CAPSTAN
QR13
FROM SYSTEM CONTROL C.B.A.
P6001-6
P4001
6
CH1 MUTE Ⓗ
CH1 R/P Ⓛ
FROM SYSTEM CONTROL C.B.A.
P6001-3
P4001
3
CH1 REC/PB Ⓛ
QR1
QR2
FROM SYSTEM CONTROL C.B.A.
P6001-4
P4001
4
CH2 REC/PB Ⓛ
QR4
QR5
CH2 R/P Ⓛ
FROM REAR (INPUT)JACK
(3) C.B.A. P6420-3
P4012
3
TC "ON" Ⓛ
Q24
TC "ON" 12V
FROM FRONT PANEL C.B.A.
P6305-3
P4005
3
CH2 NOR AUDIO IN
FROM SYSTEM CONTROL C.B.A.
P6001-2
P4001
2
CH2 E-E Ⓛ
FROM SYSTEM CONTROL C.B.A.
P6001-9
P4001
9
CH2 MUTE Ⓗ
IC2
E-E
V-V
CH2 PB EQUALIZER
VR4
CH2 PB GAIN
VR5
D9
QR2
QR5
C29
D11
QR6
QR7
C30
D10
D12
D1
D2
MUTE/ON
Q5
QR8
RY1
AUDIO
TC AUDIO
TC
TC/12V
CH2 AUDIO HEAD
P4011
3
P4011
2
Q23
REC/ON
FROM REAR (INPUT) JACK (3) C.B.A.
P6420-1
P4012
1
TIME CODE IN
REC 42Vp-p
D10
QR6
CH2 REC/ON
Q25
PB/ON
RY3
REC
PB
REC
PB
+12V
TP10
IC4
TC FOR REC
IC1
QR1
PB/ON
TC E-E
TC IN
TC P.B
IC1
Q1
E-E/ON
E-E Ⓗ
TIME CODE


REC 0.7Vp-p
ON:LIMITER"OFF"
QR417
LIMITER "ON" Ⓛ
P4002 7 FROM KEY BOARD C.B.A. P6907-7
DOLBY IN Ⓛ
P4002 6 FROM KEY BOARD C.B.A. P6907-6
Q1.Q2 AGC AMP
Q3.D2 AGC DET
IC2
E-E
V-V
1KHz 80m Vp-p
L.P.F 12KHz
H.P.F 5KHz
IC1
GAIN CONTROL
NON LINENR LIMITER
R40
MUTE/ON Q5 QR1
D9 QR2 QR5 C29 D11 D1
QR6 QR7 C30 D10 D12 D3
QR3
D5 D4 D6
CH1 AUDIO OUT
REF. NO. 400 SERIES
NORMAL AUDIO PACK (CH1)
DOLBY IN Ⓛ
CH1 REC CURRENT
VR3
C7.L7.R15.R16
CH1 REC EQUALIZER
S1
C8 C9
Q2 REC/OFF
IC3
TP3
CH2 AUDIO
CH1 BIAS
REC 0.34Vp-p
CH1 NOR AUDIO OUT
CH1 A OUT
F.E HEAD
P4007 3
FULL ERASE HEAD
T2.Q8 IMPEDANCE MATCHING
T1.Q5.Q6 70KHz OSC
Q4 CH1.CH2 REC/ON
+12V
P4004 1 FROM POWER SUPPLY C.B.A. P1006-1
D12 D21
CH1 R/P Ⓛ
CH2 R/P Ⓛ
F.E Ⓛ
Q7 REC/ON
Q9 CH1 REC/ON
T3.Q10 IMPEDANCE MATCHING
TP6
REC 100Vp-p
TP1
(dB) +10 0 -10
100 1K 10K (Hz)
(dB) 0 -10 -20 -30
100 1K 10K
0dB - 580mV (400Hz) --- ENCODE(Rec)
VCC - 12V ── DECODE(Play)
RESPONSE(dB)
FREQUENCY (Hz)
REC 0.38Vp-p
P.B 0.3Vp-p
ON:LIMITER"OFF"
QR418
Q1.Q2 AGC AMP
Q3.D2 AGC DET
IC2
IC1
H.P.F 5KHz
GAIN CONTROL
NON LINENR LIMITER
L.P.F 12KHz
1KHz 80m Vp-p
DOLBY IN Ⓛ
CH2 REC CURRENT
VR6
C15.L8.R23.R24
CH2 REC EQUALIZER
S2
IC3
TP4
CH2 AUDIO
CH2 BIAS ⑨
Q3 REC/OFF
TP2
T4.Q12 IMPEDANCE MATCHING
T5.Q14 IMPEDANCE MATCHING
Q11 CH2 REC/ON
Q13 CH1 REC/ON
CH1 AE Ⓛ
TP7
CH1 REC/ON
Q15 Q16 Q17
RETURN Ⓛ
P4006 2
CH1 AUDIO ERASE HEAD
T6.Q19 IMPEDANCE MATCHING
Q18 CH2 REC/ON
CH2 REC/ON
Q20 Q21 Q22
CH2 AE Ⓛ
TP8
RETURN Ⓛ
P4006 4
CH2 AUDIO ERASE HEAD
CH2 AE
P4006 5
CH1 AE
P4006 1
REC 0.34Vp-p
90Vp-p
REC 40mVp-p
REC 38mVp-p
MUTE/ON Q5 QR1
D9 QR2 QR5 C29 D11 D1
QR6 QR7 C30 D12 D10 D3
QR3
D5 D4 D6
CH2 AUDIO OUT
NORMAL AUDIO PACK (CH2)
REF. NO. 400 SERIES
T.C. METER
CH2 NOR AUDIO OUT
CH2 A OUT
TC FOR REC
IC1
QR1 PB/ON
TC E-E
T.C.METER ADJ
VR7
TC IN
TC P.B
IC1
Q2
Q1 E-E/ON
E-E Ⓗ
TIME CODE PACK
Q2
TC OUT
P4008 1
TO REAR (OUTPUT) JACK (2) C.B.A. P6422-1
RECORDING SIGNAL PATH
PLAYBACK SIGNAL PATH
REF.NO.4000 SERIES

WER SUPPLY SCHEMATIC DIAGRAM

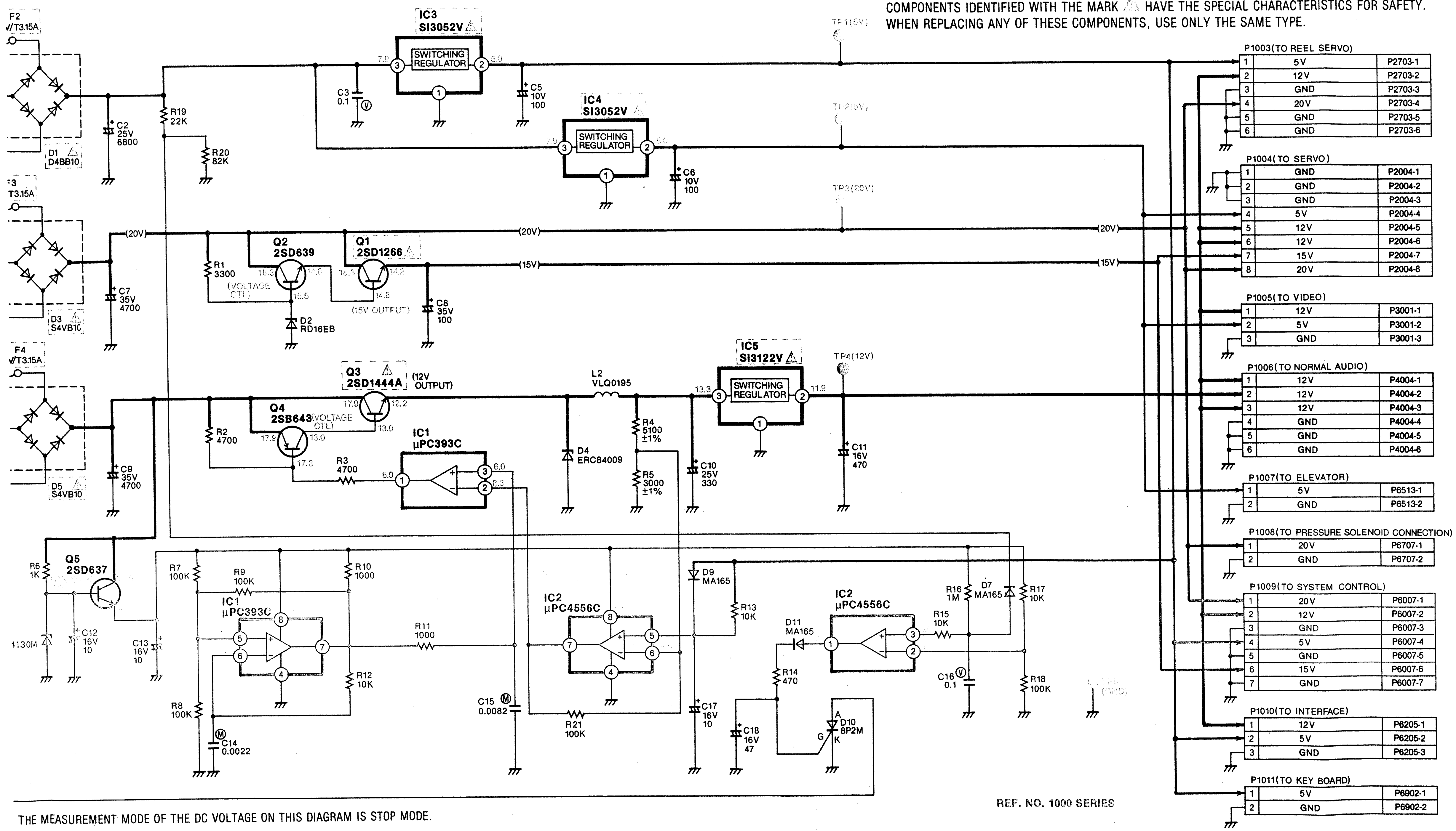
IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHA
WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME


POWER TRANSFORMER
VTP0217
F1
250V/T 2.0A
L1
VTQ0006
C1
0.22
SW1
SW2
ESE37212
T.F
BLACK 120V
BLUE
BROWN 10V
RED 0V
ORENGE
120V
WHITE 110V
VIOLET 0V
BROWN
BLUE
GREEN
AC IN
SW2
240V ①-② ⑤-⑥
220V ②-③ ⑥-⑦
110V ③-④ ⑦-⑧
120V ④-⑤ ⑧-①
F2
250V/T3.15A
GRAY
D1
D4BB10
C2
25V
6800
R19
22K
R20
82K
F3
250V/T3.15A
D3
S4VB10
C7
35V
4700
F4
250V/T3.15A
D5
S4VB10
C9
35V
4700
IC3
SI3052V
SWITCHING REGULATOR
C3
0.1
C5
10V
100
IC4
SI3052V
C6
10V
100
(20V)
(15V)
Q2
2SD639
Q1
2SD1266
R1
3300
(VOLTAGE CTL)
(15V OUTPUT)
D2
RD16EB
C8
35V
100
Q3
2SD1444A
(12V OUTPUT)
Q4
2SB643
R2
4700
R3
4700
IC1
μPC393C
L2
VLQ0195
R4
5100
±1%
R5
3000
±1%
D4
ERC84009
C10
25V
330
IC5
SI3122V
C11
16V
470
TP1(5V)
TP2(5V)
TP3(20V)
TP4(12V)
Q5
2SD637
R6
1K
D8
MA4130M
C12
16V
10
C13
16V
10
R7
100K
R9
100K
R10
1000
R8
100K
C14
0.0022
R11
1000
R12
10K
C15
0.0082
IC2
μPC4556C
R21
100K
D9
MA165
R13
10K
C17
16V
10
C18
16V
47
D11
MA165
R14
470
D10
8P2M
R15
10K
R16
1M
D7
MA165
R17
10K
C16
0.1
R18
100K
P1003
P1004
P1005
P1006
P1007
P1008
P1009
P1010
P1011
REF. NO. 1000 SERIES
1
2
3
4
5
6
7
8

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT
IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAW

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.
WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.


F2
√/T3.15A
D1 ⚠
D4BB10
C2
25V
6800
R19
22K
R20
82K
IC3
SI3052V ⚠
SWITCHING REGULATOR
7.9
5.0
C3
0.1
Ⓥ
C5
10V
100
IC4
SI3052V ⚠
7.9
5.0
C6
10V
100
TP1(5V)
TP2(5V)
TP3(20V)
TP4(12V)
F3
T3.15A
D3 ⚠
S4VB10
C7
35V
4700
(20V)
(15V)
R1
3300
(VOLTAGE CTL)
Q2
2SD639
18.3
14.8
15.5
Q1
2SD1266 ⚠
18.3
14.2
14.8
(15V OUTPUT)
D2
RD16EB
C8
35V
100
F4
√/T3.15A
D5 ⚠
S4VB10
C9
35V
4700
Q3 ⚠
2SD1444A
(12V OUTPUT)
17.9
12.2
13.0
Q4
2SB643
(VOLTAGE CTL)
17.9
13.0
17.3
R2
4700
R3
4700
IC1
μPC393C
6.0
8.3
L2
VLQ0195
D4
ERC84009
R4
5100
±1%
R5
3000
±1%
C10
25V
330
IC5
SI3122V ⚠
13.3
11.9
C11
16V
470
R6
1K
Q5
2SD637
1130M
C12
16V
10
C13
16V
10
R7
100K
R9
100K
R10
1000
R8
100K
C14
Ⓜ
0.0022
R11
1000
R12
10K
C15 Ⓜ
0.0082
IC2
μPC4556C
R21
100K
D9
MA165
R13
10K
C17
16V
10
D11
MA165
R14
470
C18
16V
47
D10
8P2M
A
G
K
R16
1M
D7
MA165
R17
10K
R15
10K
C16 Ⓥ
0.1
R18
100K
(GND)

P1003(TO REEL SERVO)

1	5V	P2703-1
2	12V	P2703-2
3	GND	P2703-3
4	20V	P2703-4
5	GND	P2703-5
6	GND	P2703-6

P1004(TO SERVO)

1	GND	P2004-1
2	GND	P2004-2
3	GND	P2004-3
4	5V	P2004-4
5	12V	P2004-5
6	12V	P2004-6
7	15V	P2004-7
8	20V	P2004-8

P1005(TO VIDEO)

1	12V	P3001-1
2	5V	P3001-2
3	GND	P3001-3

P1006(TO NORMAL AUDIO)

1	12V	P4004-1
2	12V	P4004-2
3	12V	P4004-3
4	GND	P4004-4
5	GND	P4004-5
6	GND	P4004-6

P1007(TO ELEVATOR)

1	5V	P6513-1
2	GND	P6513-2

P1008(TO PRESSURE SOLENOID CONNECTION)

1	20V	P6707-1
2	GND	P6707-2

P1009(TO SYSTEM CONTROL)

1	20V	P6007-1
2	12V	P6007-2
3	GND	P6007-3
4	5V	P6007-4
5	GND	P6007-5
6	15V	P6007-6
7	GND	P6007-7

P1010(TO INTERFACE)

1	12V	P6205-1
2	5V	P6205-2
3	GND	P6205-3

P1011(TO KEY BOARD)

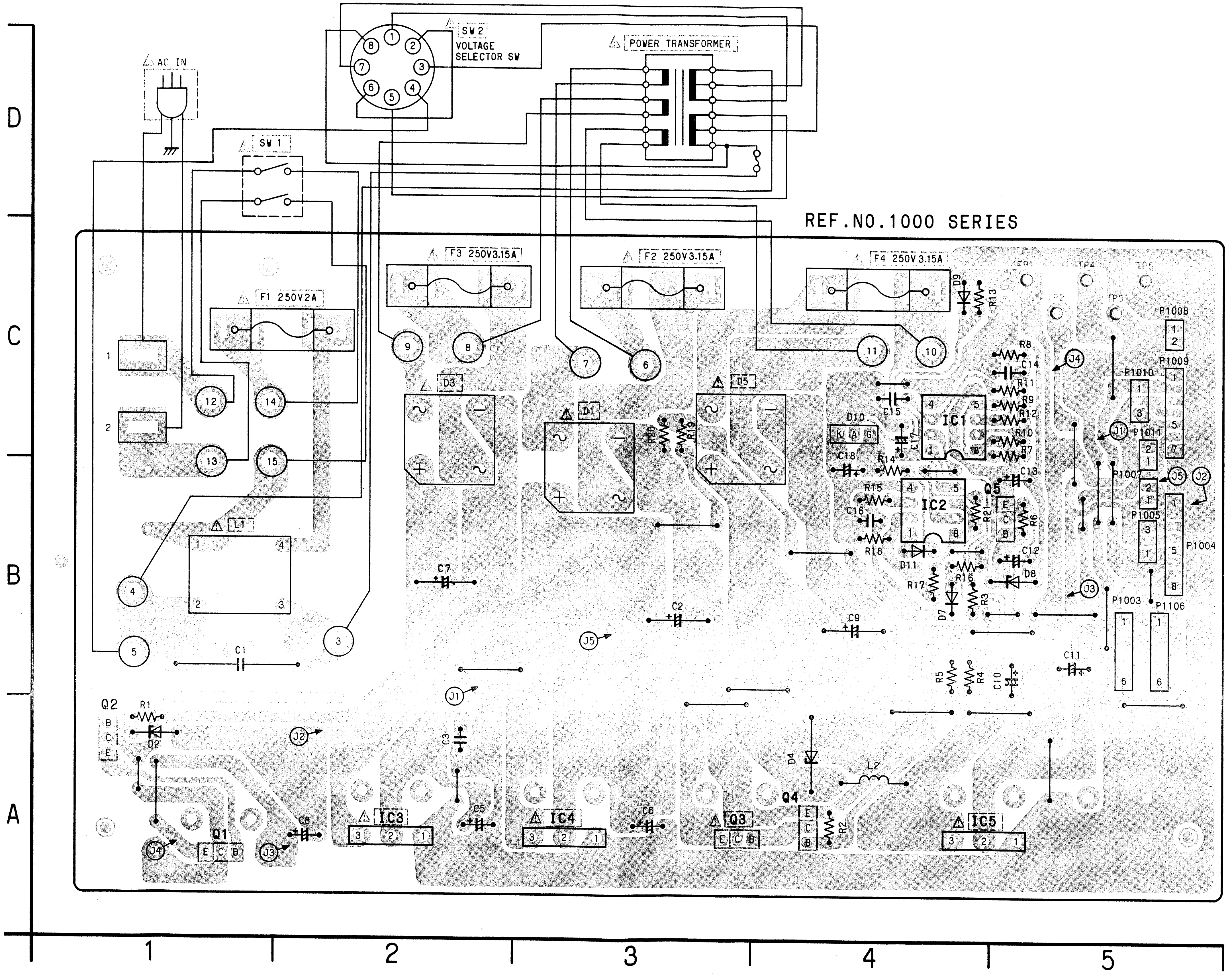
1	5V	P6902-1
2	GND	P6902-2

REF. NO. 1000 SERIES

THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

POWER SUPPLY C.B.A. (VEP01267A)

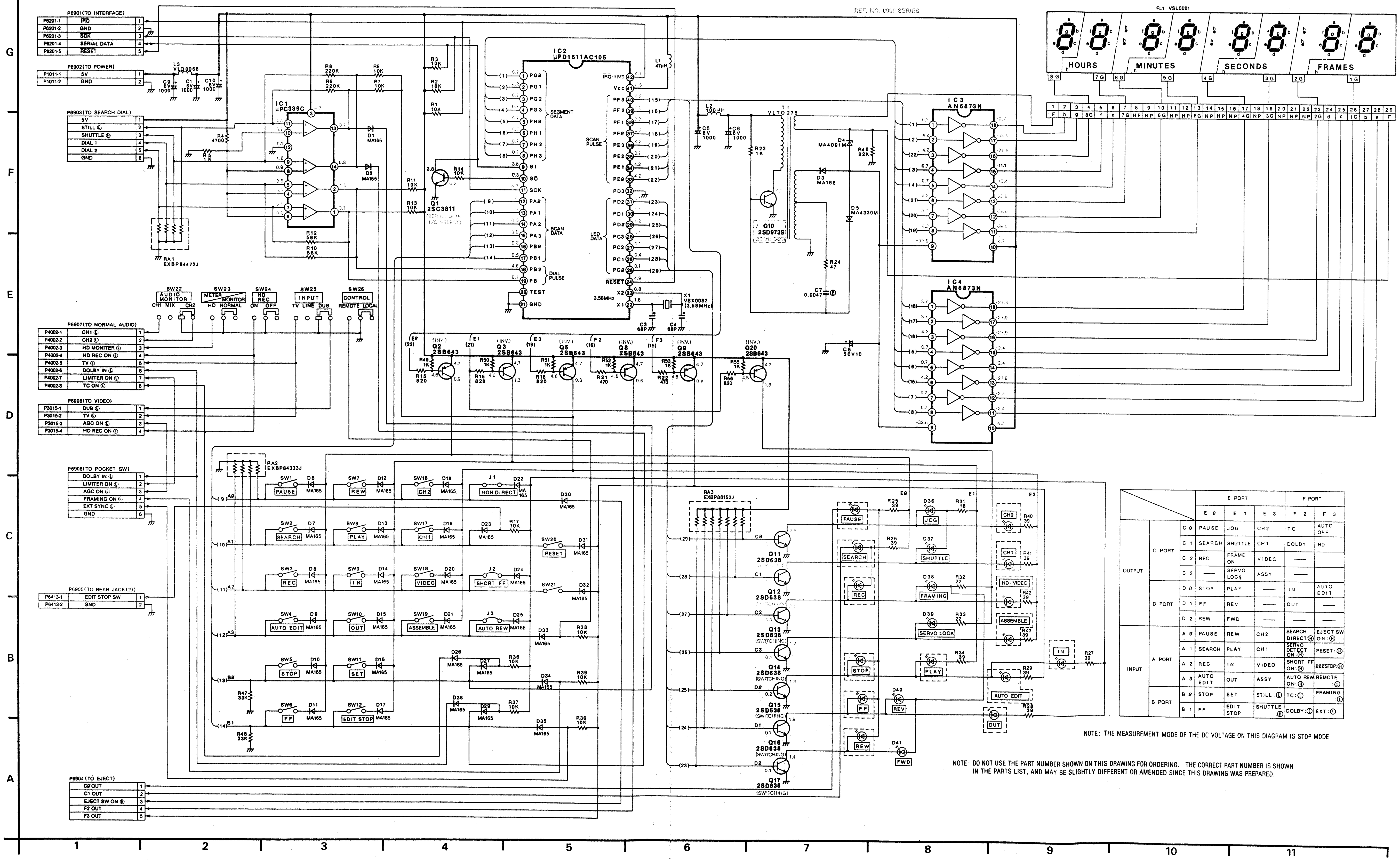

SW2
VOLTAGE SELECTOR SW
POWER TRANSFORMER
AC IN
SW1
REF.NO.1000 SERIES
F3 250V3.15A
F2 250V3.15A
F4 250V 3.15A
F1 250V2A
D3
D1
D5
D9
R13
TP1
TP4
TP5
TP2
TP3
P1008
P1009
P1010
P1011
P1007
P1005
P1004
P1003
P1106
R8
C14
R11
R9
R12
R10
R7
IC1
IC2
Q5
D10
K A G
C15
C17
C18
R14
R15
C16
R18
R21
R6
C13
C12
D11
R17
R16
D8
D7
R3
R20
R19
L1
C7
C2
C9
C1
C11
R5
R4
C10
Q2
R1
D2
B C E
Q1
E C B
C8
C3
C5
C6
IC3
IC4
Q3
Q4
D4
L2
R2
IC5
J1
J2
J3
J4
J5
D
C
B
A
1
2
3
4
5

Power Supply C.B.A.	
Transistor	
Q1001	A-1
Q1002	A-1
Q1003	A-3
Q1004	A-4
Q1005	B-5
Integrated Circuit	
IC1001	C-4
IC1002	B-4
IC1003	A-2
IC1004	A-3
IC1005	A-4
Test Point	
TP1001	C-5
TP1002	C-5
TP1003	C-5
TP1004	C-5
TP1005	C-5

ADDRESS INFORMATION

KEY BOARD SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.
WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.

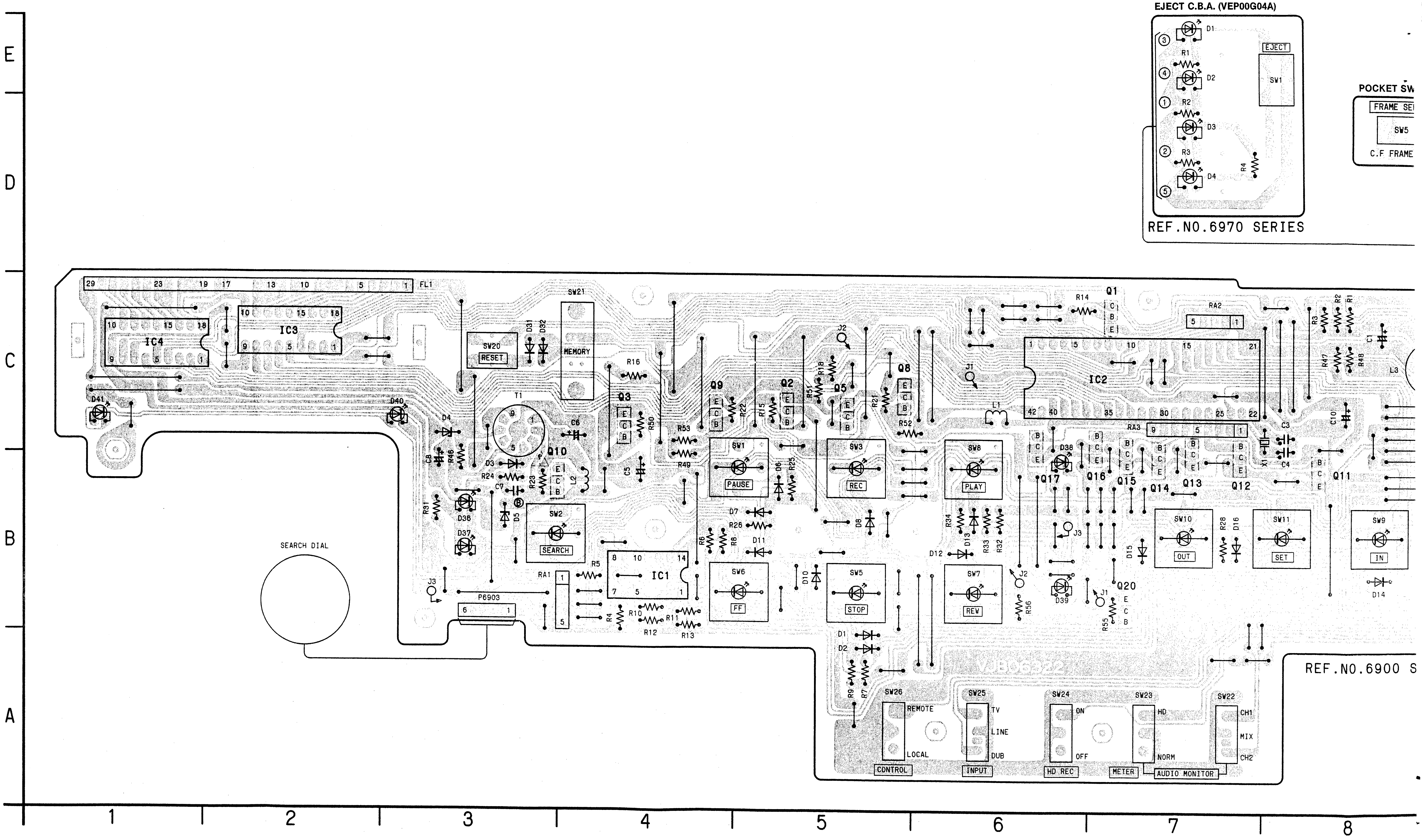

REF. NO. 6900 SERIES
P6901 (TO INTERFACE)
P6201-1 IRQ
P6201-2 GND
P6201-3 SCK
P6201-4 SERIAL DATA
P6201-5 RESET
P6902 (TO POWER)
P1011-1 5V
P1011-2 GND
P6903 (TO SEARCH DIAL)
5V
STILL
SHUTTLE
DIAL 1
DIAL 2
GND
P6907 (TO NORMAL AUDIO)
P4002-1 CH1
P4002-2 CH2
P4002-3 HD MONITER
P4002-4 HD REC ON
P4002-5 TV
P4002-6 DOLBY IN
P4002-7 LIMITER ON
P4002-8 TC ON
P6908 (TO VIDEO)
P3015-1 DUB
P3015-2 TV
P3015-3 AGC ON
P3015-4 HD REC ON
P6906 (TO POCKET SW)
DOLBY IN
LIMITER ON
AGC ON
FRAMING ON
EXT SYNC
GND
P6905 (TO REAR JACK (2))
P6413-1 EDIT STOP SW
P6413-2 GND
P6904 (TO EJECT)
C0 OUT
C1 OUT
EJECT SW ON
F2 OUT
F3 OUT
IC1 μPC339C
IC2 μPD1511AC105
IC3 AN6873N
IC4 AN6873N
Q1 2SC3811
Q2 2SB643
Q3 2SB643
Q5 2SB643
Q8 2SB643
Q9 2SB643
Q20 2SB643
Q10 2SD973S
Q11 2SD638
Q12 2SD638
Q13 2SD638
Q14 2SD638
Q15 2SD638
Q16 2SD638
Q17 2SD638
RA1 EXBP84472J
RA2 EXBP84333J
RA3 EXBP88152J
X1 VSX0082 (3.58MHz)
T1 VLT0275
FL1 VSL0081
HOURS
MINUTES
SECONDS
FRAMES
SW22 AUDIO MONITOR CH1 MIX CH2
SW23 METER MONITOR HD NORMAL
SW24 HD REC ON OFF
SW25 INPUT TV LINE DUB
SW26 CONTROL REMOTE LOCAL
PAUSE
SEARCH
REC
AUTO EDIT
STOP
FF
REW
PLAY
IN
OUT
SET
EDIT STOP
CH2
CH1
VIDEO
ASSEMBLE
NON DIRECT
SHORT FF
AUTO REW
RESET
JOG
SHUTTLE
FRAMING
SERVO LOCK
HD VIDEO
REV
FWD
1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G

			E PORT			F PORT	
			E 0	E 1	E 3	F 2	F 3
OUTPUT	C PORT	C 0	PAUSE	JOG	CH2	TC	AUTO OFF
		C 1	SEARCH	SHUTTLE	CH1	DOLBY	HD
		C 2	REC	FRAME ON	VIDEO	——	
		C 3	——	SERVO LOCK	ASSY	——	
	D PORT	D 0	STOP	PLAY	——	IN	AUTO EDIT
		D 1	FF	REV	——	OUT	——
		D 2	REW	FWD	——	——	——
INPUT	A PORT	A 0	PAUSE	REW	CH2	SEARCH DIRECT:Ⓗ	EJECT SW ON:Ⓗ
		A 1	SEARCH	PLAY	CH1	SERVO DETECT ON:Ⓗ	RESET:Ⓗ
		A 2	REC	IN	VIDEO	SHORT FF ON:Ⓗ	000STOP:Ⓗ
		A 3	AUTO EDIT	OUT	ASSY	AUTO REW ON:Ⓗ	REMOTE :Ⓛ
	B PORT	B 0	STOP	SET	STILL:Ⓛ	TC:Ⓛ	FRAMING :Ⓛ
		B 1	FF	EDIT STOP	SHUTTLE :Ⓗ	DOLBY:Ⓛ	EXT:Ⓛ

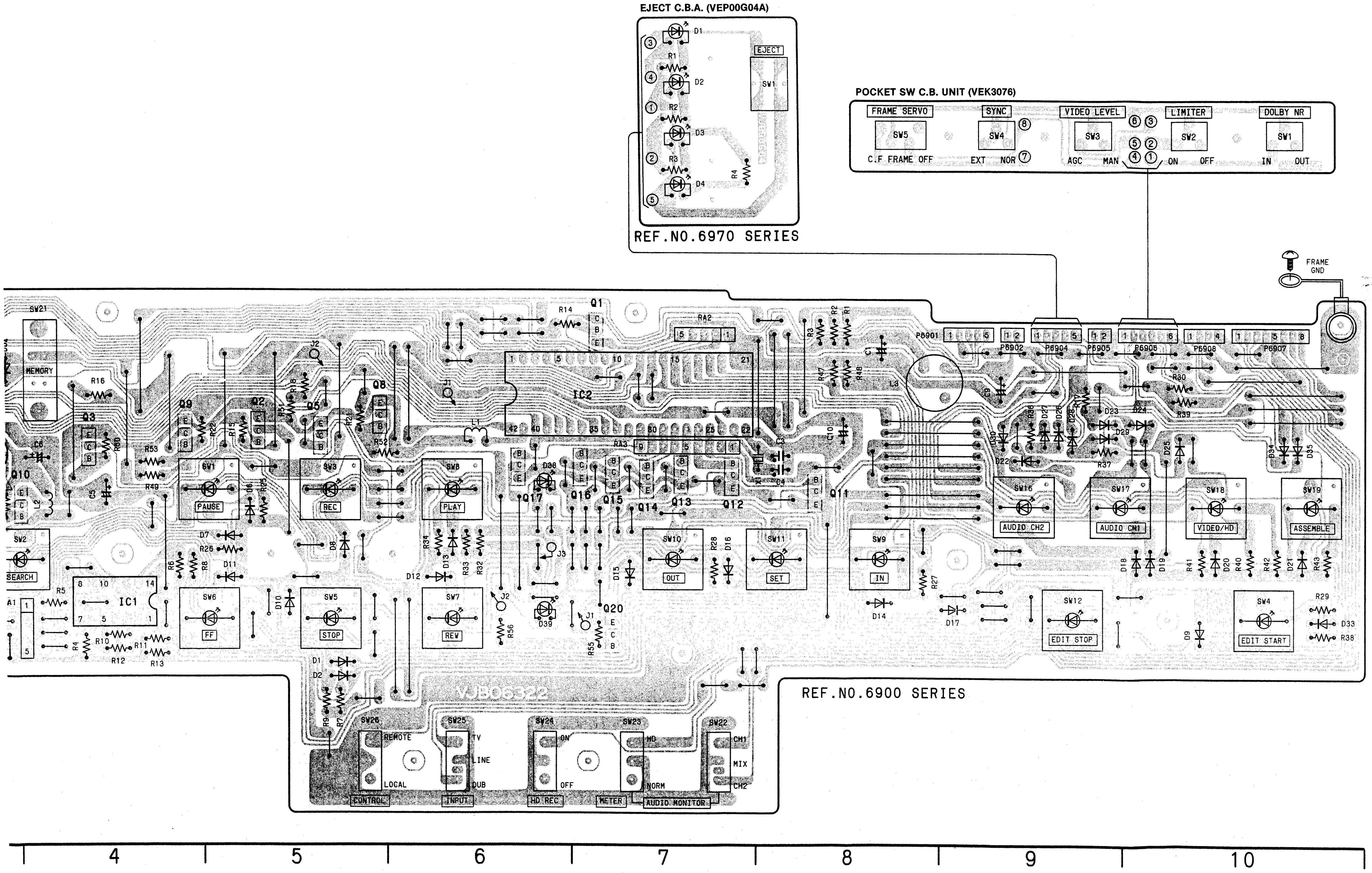
NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

KEY BOARD C.B.A. (VEP06322B)



EJECT C.B.A. (VEP00G04A)
EJECT
SW1
D1
D2
D3
D4
R1
R2
R3
R4
REF.NO.6970 SERIES
POCKET SW
FRAME SE
SW5
C.F FRAME
E
D
C
B
A
1
2
3
4
5
6
7
8
FL1
IC4
IC3
IC2
IC1
SW20
RESET
SW21
MEMORY
SW1
PAUSE
SW3
REC
SW8
PLAY
SW2
SEARCH
SW6
FF
SW5
STOP
SW7
REW
SW10
OUT
SW11
SET
SW9
IN
SEARCH DIAL
P6903
RA1
RA2
RA3
T1
L1
L2
L3
X1
Q1
Q2
Q3
Q5
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q20
D36
D37
D38
D39
D40
D41
J1
J2
J3
SW26
REMOTE
LOCAL
CONTROL
SW25
TV
LINE
DUB
INPUT
SW24
ON
OFF
HD REC
SW28
HD
NORM
METER
AUDIO MONITOR
SW22
CH1
MIX
CH2
VJB06322
REF.NO.6900 S

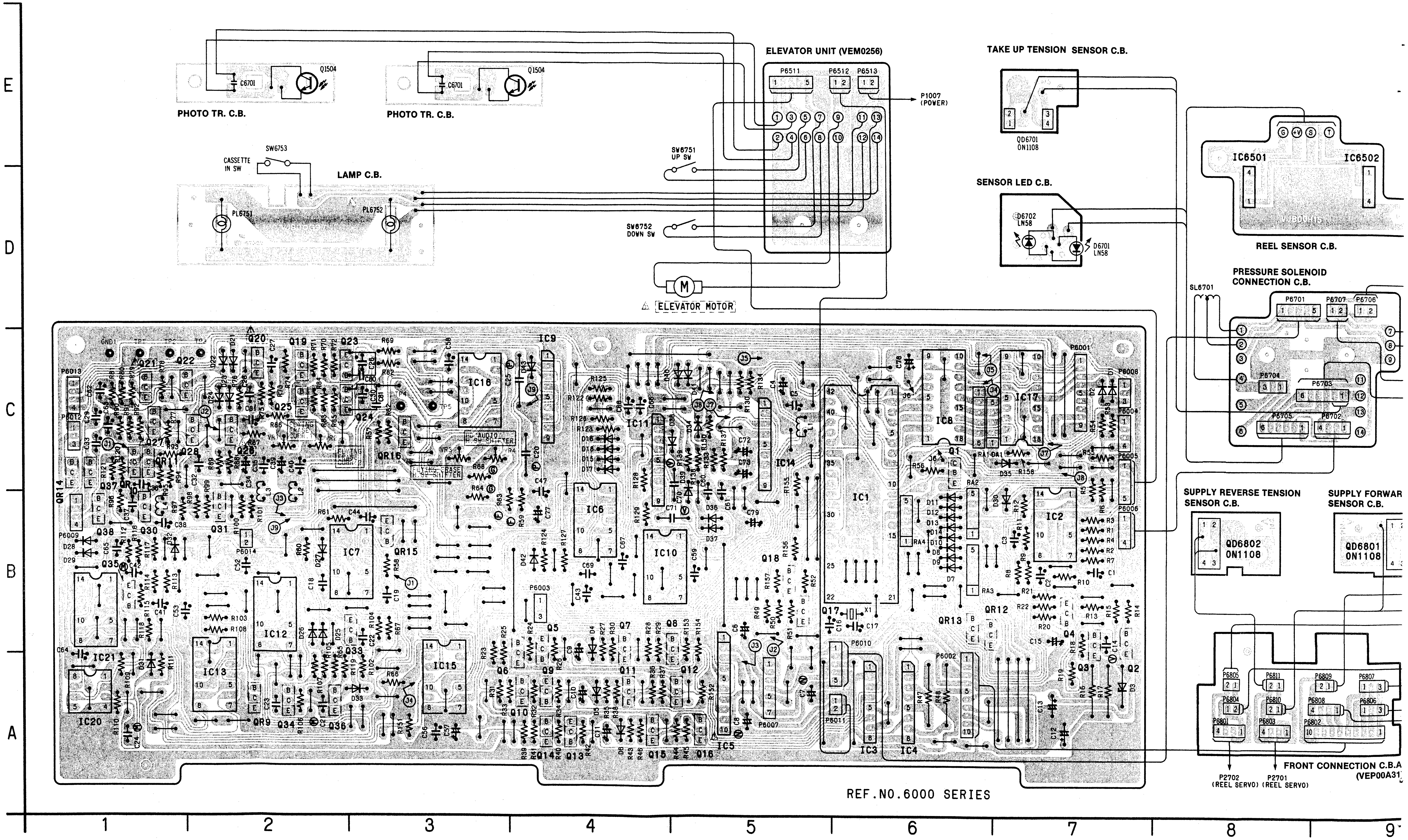

EJECT C.B.A. (VEP00G04A)
D1
D2
D3
D4
R1
R2
R3
R4
EJECT
SW1
③
④
①
②
⑤
REF.NO.6970 SERIES
POCKET SW C.B. UNIT (VEK3076)
FRAME SERVO
SW5
C.F FRAME OFF
SYNC
SW4
EXT NOR
VIDEO LEVEL
SW3
AGC MAN
LIMITER
SW2
ON OFF
DOLBY NR
SW1
IN OUT
⑥ ③ ⑤ ② ④ ① ⑦ ⑧
FRAME GND
SW21
MEMORY
SW2
SEARCH
SW1
PAUSE
SW3
REC
SW8
PLAY
SW6
FF
SW5
STOP
SW7
REW
SW10
OUT
SW11
SET
SW9
IN
SW16
AUDIO CH2
SW17
AUDIO CH1
SW18
VIDEO/HD
SW19
ASSEMBLE
SW12
EDIT STOP
SW4
EDIT START
SW26
REMOTE
LOCAL
CONTROL
SW25
TV
LINE
DUB
INPUT
SW24
ON
OFF
HD REC
SW23
HD
NORM
METER
SW22
CH1
MIX
CH2
AUDIO MONITOR
IC1
IC2
Q1
Q2
Q3
Q5
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q20
L1
L2
L3
J1
J2
J3
RA1
RA2
RA3
P6901
P6902
P6904
P6905
P6906
P6908
P6907
VJB06322
REF.NO.6900 SERIES
4
5
6
7
8
9
10

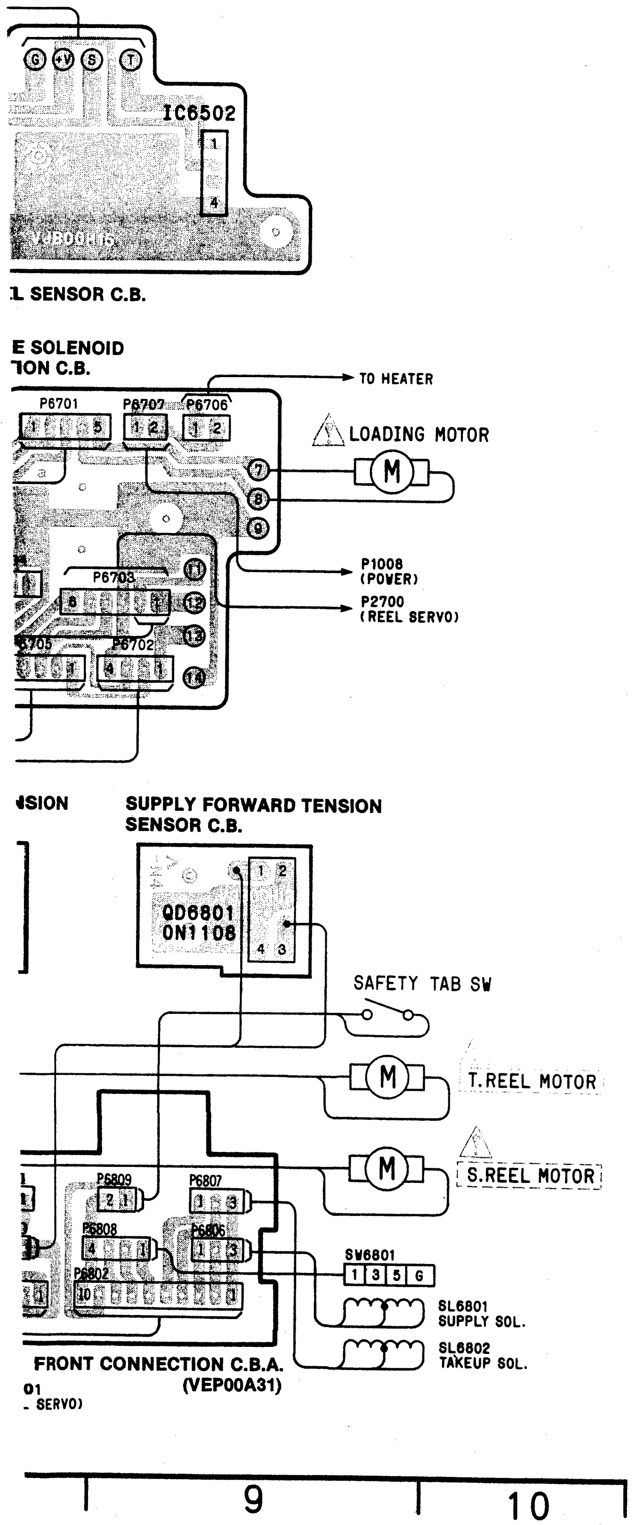
Key Board C.B.A.

Transistor	
Q6901	C-7
Q6902	C-5
Q6903	C-4
Q6905	C-5
Q6908	C-5
Q6909	C-4
Q6910	B-3
Q6911	B-8
Q6912	B-7
Q6913	B-7
Q6914	B-7
Q6915	C-7
Q6916	C-7
Q6917	C-6
Q6920	B-7
Integrated Circuit	
IC6901	B-4
IC6902	C-7
IC6903	C-2
IC6904	C-1

ADDRESS INFORMATION

SYSTEM CONTROL C.B.A. (VEP06319B1)


E
D
C
B
A
1
2
3
4
5
6
7
8
9
PHOTO TR. C.B.
PHOTO TR. C.B.
C6701
Q1504
CASSETTE IN SW
SW6753
LAMP C.B.
PL6751
PL6752
ELEVATOR UNIT (VEM0256)
P6511
P6512
P6513
P1007 (POWER)
SW6751 UP SW
SW6752 DOWN SW
ELEVATOR MOTOR
TAKE UP TENSION SENSOR C.B.
QD6701 ON1108
SENSOR LED C.B.
D6702 LN58
D6701 LN58
IC6501
IC6502
REEL SENSOR C.B.
PRESSURE SOLENOID CONNECTION C.B.
SL6701
P6701
P6707
P6706
P6704
P6703
P6705
P6702
SUPPLY REVERSE TENSION SENSOR C.B.
QD6802 ON1108
SUPPLY FORWAR SENSOR C.B.
QD6801 ON1108
FRONT CONNECTION C.B.A (VEP00A31
P2702 (REEL SERVO)
P2701 (REEL SERVO)
P6805
P6811
P6809
P6807
P6804
P6810
P6808
P6806
P6801
P6803
P6802
GND1
TP1
TP2
TP3
TP4
TP5
P6013
P6012
P6009
P6014
P6003
P6010
P6011
P6002
P6007
P6001
P6008
P6004
P6005
P6006
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC20
IC21
X1
REF.NO.6000 SERIES


G
+V
S
T
IC6502
1
4
VJB00H15
L SENSOR C.B.
E SOLENOID
ION C.B.
TO HEATER
P6701
P6707
P6706
LOADING MOTOR
M
7
8
9
11
12
13
14
P6703
P6705
P6702
P1008
(POWER)
P2700
(REEL SERVO)
SION
SUPPLY FORWARD TENSION
SENSOR C.B.
QD6801
ON1108
SAFETY TAB SW
T.REEL MOTOR
S.REEL MOTOR
P6809
P6807
P6808
P6806
P6802
SW6801
1 3 5 G
SL6801
SUPPLY SOL.
SL6802
TAKEUP SOL.
FRONT CONNECTION C.B.A.
(VEP00A31)
01
SERVO)
9
10

System Control C.B.A.

Transistor

Q6001	C-6
Q6002	B-7
Q6003	B-7
Q6004	B-7
Q6005	B-4
Q6006	B-4
Q6007	B-4
Q6008	B-5
Q6009	A-4
Q6010	A-4
Q6011	B-4
Q6012	A-5
Q6013	A-4
Q6014	A-4
Q6015	A-4
Q6016	A-5
Q6017	B-5
Q6018	B-5
Q6019	C-2
Q6020	C-2
Q6021	C-1
Q6022	C-2
Q6023	C-3
Q6024	C-3
Q6025	C-2
Q6026	C-2
Q6027	C-1
Q6028	C-2
Q6030	B-1
Q6031	B-2
Q6033	B-3
Q6034	A-2
Q6035	B-1
Q6036	A-2
Q6037	C-1
Q6038	B-1

Transistor & Resistor

QR6009	A-2
QR6010	C-1
QR6011	C-1
QR6012	B-6
QR6013	B-6
QR6014	C-1
QR6015	B-3
QR6016	C-3

Integrated Circuit

IC6001	C-6
IC6002	B-7
IC6003	A-6
IC6004	A-6
IC6005	A-5
IC6006	B-4
IC6007	B-3
IC6008	C-6
IC6009	C-4
IC6010	B-4
IC6011	C-4
IC6012	B-2
IC6013	A-2
IC6014	C-5
IC6015	A-3
IC6016	C-3
IC6017	C-7
IC6020	A-1
IC6021	B-1

Test Point

TP6001	C-1
TP6002	C-1
TP6003	C-2
TP6004	C-3
TP6005	C-3
GND1	C-1

Adjustment

VR6001	C-2
VR6002	C-2
VR6003	C-3
VR6004	C-3

ADDRESS INFORMATION

SYSTEM CONTROL TRANSISTORs DC VOLTAGE CHART

REF. NO.	Q6001			Q6002			Q6003			Q6004			Q6005			Q6006		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	3.6	0.1	0	3.3	0.2	9.4	3.6	9.0	0	7.3	−0.4	0	5.0	0.1	0	0.1	0.7
PLAY	0	3.6	0.1	0	3.3	0.2	9.0	3.6	8.6	0	7.0	−0.4	4.3	5.0	4.9	0	4.9	0
REC	0	3.6	0.1	0	3.3	0.2	8.8	3.6	8.5	0	7.0	−0.4	4.3	5.0	4.9	0	4.9	0
F.F	0	3.6	0.1	0	3.3	0.2	9.0	3.6	9.0	0	7.0	−0.4	0	5.0	0.1	0	0.1	0.7
REW	0	3.6	0.1	0	3.3	0.2	9.0	3.6	9.0	0	7.0	−0.4	0.1	5.0	0.1	0	0.1	0.7
REF. NO.	Q6007			Q6008			Q6009			Q6010			Q6011			Q6012		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	0.7	0	0	0.1	0.7	0	5.0	0.1	0	0.1	0.7	0	0.7	0	0	0.1	0.7
PLAY	0	0.7	0	0	0.1	0.7	4.3	5.0	4.9	0	4.9	0	0	0.7	0	0	0.1	0.7
REC	0	0.7	0	0	0.1	0.7	4.3	5.0	4.9	0	4.9	0	0	0	0	0	0.1	0.7
F.F	0	0.7	0	0	0.1	0.7	4.3	5.0	4.9	0	4.9	0	0	0.7	0	0	0.1	0.7
REW	0	0.7	0	0	0.1	0.7	4.3	5.0	4.9	0	4.9	0	0	0.7	0	0	0.1	0.7
REF. NO.	Q6013			Q6014			Q6015			Q6016			Q6017			Q6018		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	5.0	0.1	0	0.1	0.6	0	0.7	0	0	0.1	0.7	0	9.8	0	0	9.8	0
PLAY	4.3	5.0	4.9	0	4.9	0	0	0.7	0	0	0.1	0.7	0	9.8	0	0	9.8	0
REC	4.3	5.0	0	0	4.9	0	0	0.7	0	0	0.1	0.7	0	9.8	0	0	9.8	0
F.F	4.3	5.0	4.9	0	4.9	0	0	0.7	0	0	0.1	0.7	0	9.8	0	0	9.8	0
REW	4.3	5.0	4.9	0	4.9	0	0	0.7	0	0	0.1	0.7	0	9.8	0	0	9.8	0
REF. NO.	Q6019			Q6020			Q6021			Q6022			Q6023			Q6024		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	11.9	0	1.5	6.3	2.1	7.1	11.6	7.7	6.9	0	6.3	0	0	0.6	0	0	0.6
PLAY	0	11.9	0	1.5	6.3	2.1	7.1	11.3	7.7	6.9	0	6.3	0	0	0	0	0	0.6
REC	0	11.9	0	1.5	6.3	2.1	7.1	11.4	7.7	6.9	0	6.3	0	0	0.6	0	0	0.6
F.F	0	11.9	0	1.5	6.3	2.1	7.1	11.3	7.7	6.9	0	6.3	0	0	0.6	0	0	0.6
REW	0	11.9	0	1.5	6.3	2.1	7.1	11.4	7.7	6.9	0	6.3	0	0	0.6	0	0	0.6
REF. NO.	Q6025			Q6026			Q6027			Q6028			Q6030			Q6031		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	11.9	0	1.5	6.3	2.2	7.2	11.3	7.8	6.9	0	6.3	0	11.9	0	5.6	11.9	6.3
PLAY	0	11.9	0	1.5	6.3	2.2	7.2	11.3	7.8	6.9	0	6.3	0	11.9	0	5.6	11.9	6.3
REC	0	11.9	0	1.5	6.3	2.2	7.2	11.4	7.8	6.9	0	6.3	0	11.9	0	5.6	11.9	6.3
F.F	0	11.9	0	1.5	6.3	2.2	7.2	11.4	7.8	6.9	0	6.3	0	11.9	0	5.6	11.9	6.3
REW	0	11.9	0	1.5	6.3	2.2	7.2	11.4	7.8	6.9	0	6.3	0	11.9	0	5.6	11.9	6.3
REF. NO.	Q6033			Q6034			Q6035			Q6036			Q6037			Q6038		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	4.7	0	0	4.5	0	0	4.5	0	0	0.4	0	0	0	0.6	0	0	0.6
PLAY	0	4.7	0	0	4.5	0	0	4.5	0	0	1.4	0.2	0	0	0.6	0	0	0.6
REC	0	4.7	0	0	4.2	0	0	4.2	0	0	1.4	0.2	0	0	0.6	0	0	0.6
F.F	0	4.7	0	0	4.5	0	0	4.5	0	0	1.4	0.2	0	0	0.6	0	0	0.6
REW	0	4.7	0	0	4.5	0	0	4.5	0	0	1.4	0.2	0	0	0.6	0	0	0.6
REF. NO.	QR6009			QR6010			QR6011			QR6012			QR6013			QR6014		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	4.9	0	0	7.3	0	0	0	7.3	5.0	4.9	0.1	5.0	0.1	4.9	0	11.9	0
PLAY	0	4.9	0	0	7.3	0	0	0	7.3	5.0	4.9	0.1	5.0	0.1	4.9	0	11.9	0
REC	0	0.5	0	0	7.3	0	0	0	7.3	5.0	4.9	0.1	5.0	0.1	4.9	0	0	4.8
F.F	0	4.9	0	0	7.3	0	0	0	7.3	5.0	4.9	0.1	5.0	0.1	4.9	0	11.9	0
REW	0	4.9	0	0	7.3	0	0	0	7.3	5.0	4.9	0.1	5.0	0.1	4.9	0	11.9	0
REF. NO.	QR6015			QR6016														
MODE	E	C	B	E	C	B												
STOP	0	0	4.8	0	5.0	0												
PLAY	0	1.9	2.4	0	2.5	1.9												
REC	0	1.9	2.4	0	2.5	1.9												
F.F	0	1.9	2.4	0	2.5	1.9												
REW	0	1.9	2.4	0	2.5	1.9												

SYSTEM CONTROL ICs DC VOLTAGE CHART

REF. NO.	IC6001																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	3.6	3.5	3.5	0	3.6	3.5	3.5	4.0	3.6	0.2	4.7	3.7	0.2	3.6	0.1	5.0	5.0	3.3	0	0
PLAY	0.1	3.5	3.5	0	0.1	3.5	3.5	4.0	3.6	0.2	4.7	3.7	0.2	3.6	0.1	5.0	5.0	3.3	2.3	0
REC	3.6	0	3.5	0	3.6	0	3.5	4.0	3.6	0.2	4.7	3.7	0.2	3.6	0.1	5.0	5.0	3.3	2.3	0
F.F	3.6	3.5	3.5	0	3.6	3.5	3.5	4.0	3.6	0.2	4.7	3.7	0.2	3.6	0.1	5.0	5.0	3.3	0	0
REW	3.6	3.5	3.5	0	3.6	3.5	3.5	4.0	3.6	0.2	4.7	3.7	0.2	3.6	0.1	5.0	5.0	3.3	0	0

REF. NO.	IC6001																			
MODE	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
STOP	0	1.8	1.2	4.8	4.9	0.1	0.6	0.5	4.2	4.2	3.6	0	0	0	0	0	4.2	4.7	3.8	3.5
PLAY	0	1.8	1.0	4.8	4.9	0.1	0.6	0.5	0	0	0	0	0	0	0	0	0.1	4.7	3.8	3.5
REC	0	1.8	1.0	4.8	4.9	0.1	0.7	0.5	0	0	0	0	0	0	0	0	4.2	0	3.8	0
F.F	0	1.8	1.0	4.8	4.9	0.1	0.6	0.5	4.2	0	0	0	0	0	0	0	4.2	4.7	3.9	3.5
REW	0	1.8	1.0	4.8	4.9	0.1	0.7	0.5	4.2	0	0	0	0	0	0	0	4.2	4.7	3.9	3.5

REF. NO.	IC6001	
MODE	41	42
STOP	4.8	4.7
PLAY	4.8	4.7
REC	4.8	4.7
F.F	4.8	4.7
REW	4.8	4.7

REF. NO.	IC6002													
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
STOP	5.0	5.0	5.0	3.1	3.5	3.1	3.6	0	0.3	0.6	0.6	0	0	4.1
PLAY	5.0	5.0	5.0	3.1	3.5	3.1	3.6	0	0.3	0.6	0.6	0	0	4.1
REC	5.0	5.0	5.0	3.1	3.5	3.1	3.6	0	0.3	0.7	0.7	0	0	4.1
F.F	5.0	5.0	5.0	3.1	3.5	3.1	3.6	0	0.3	0.6	0	0	0	0
REW	5.0	5.0	5.0	3.1	3.5	3.1	3.6	0	0.3	0.7	0.1	0	0	4.1

REF. NO.	IC6003								IC6004							
MODE	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
STOP	0	0.1	18.5	0.1	18.4	0.1	18.5	0	0	0	18.4	0	18.4	0	18.4	0
PLAY	0	0.1	16.5	0.1	16.6	0.1	16.6	0	0	1.3	0.7	1.3	0.7	1.3	0.7	0
REC	0	0.1	16.4	0.1	16.5	0.1	16.2	0	0	1.3	0.7	1.3	0.7	1.3	0.7	0
F.F	0	0.1	17.1	0.1	16.4	0.1	16.6	0	0	0	17.1	1.3	0.7	1.3	0.7	0
REW	0	0.1	17.5	0.1	16.8	0.1	16.9	0	0	0	17.7	1.3	0.7	1.3	0.7	0

REF. NO.	IC6005									
MODE	1	2	3	4	5	6	7	8	9	10
STOP	0	0.6	0.6	0	0	0	14.2	9.8	14.2	0.6
PLAY	0	0.6	0.6	0	0	0	14.2	9.8	14.2	0.6
REC	0	0.6	0.6	0	0	0	14.2	9.8	14.2	0.6
F.F	0	0.6	0.6	0	0	0	14.2	9.8	14.2	0.6
REW	0	0.6	0.6	0	0	0	14.2	9.8	14.2	0.6

REF. NO.	IC6006													
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
STOP	3.5	3.5	0	0	0	0	0	3.5	3.2	0	0	3.5	3.2	5.0
PLAY	3.5	3.5	0	0	0	0	0	3.5	3.2	0	0	3.5	3.2	5.0
REC	0	0	0	0	0	0	0	0	0	0	0	0	0	5.0
F.F	3.5	3.5	0	0	0	0	0	3.5	3.2	0	0	3.5	3.2	5.0
REW	3.5	3.5	0	0	0	0	0	3.5	3.2	0	0	3.5	3.2	5.0

REF. NO.	IC6007													
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
STOP	0	0	0	4.8	5.0	0	0	0	0	0.1	5.0	0	5.0	5.0
PLAY	1.9	1.9	0	4.8	5.0	0	0	1.5	3.1	1.5	1.7	3.3	5.0	5.0
REC	1.9	1.9	0	4.8	5.0	0	0	1.5	3.1	1.5	1.7	3.3	5.0	5.0
F.F	1.9	1.9	0	4.8	5.0	0	0	1.5	3.1	1.5	1.7	3.3	5.0	5.0
REW	1.9	1.9	0	4.8	5.0	0	0	1.5	3.1	1.5	1.7	3.3	5.0	5.0

REF. NO.	IC6008																	
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
STOP	3.5	3.5	3.5	3.5	3.5	3.6	3.6	0	0	0	11.8	0.2	0.2	0.1	0.1	0.1	0.1	0.1
PLAY	3.5	3.5	3.5	3.5	3.5	0.1	0.1	0	0	0	11.8	11.5	11.5	0.1	0.1	0.1	0.1	0.1
REC	0	3.5	0	3.5	0	3.6	3.6	4.8	0	0	0.3	0.2	0.2	2.8	0.1	2.8	0.1	2.8
F.F	3.5	3.5	3.5	3.5	3.5	3.6	3.6	0	0	0	11.8	0.2	0.2	0.1	0.1	0.1	0.1	0.1
REW	3.5	3.5	3.5	3.5	3.5	3.6	3.6	0	0	0	11.8	0.2	0.2	0.1	0.1	0.1	0.1	0.1

REF. NO.	IC6009								
MODE	1	2	3	4	5	6	7	8	9
STOP	5.0	0	0.1	4.8	0	4.8	0.1	0	5.0
PLAY	5.0	1.5	0.4	4.8	0	4.8	0.8	3.3	5.0
REC	5.0	1.5	0.4	4.8	0	4.8	0.8	3.3	5.0
F.F	5.0	1.5	0.4	4.8	0	4.8	0.8	3.3	5.0
REW	5.0	1.5	0.4	4.8	0	4.8	0.8	3.3	5.0

REF. NO.	IC6010													
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
STOP	0	4.9	0	5.0	0	5.0	0	0	5.0	5.0	0	4.9	0	5.0
PLAY	0	4.9	0	5.0	0	5.0	0	0	5.0	5.0	0	4.9	0	5.0
REC	0	4.9	0	5.0	0	5.0	0	0	5.0	5.0	0	4.9	0	5.0
F.F	0	4.9	0	5.0	0	5.0	0	0	5.0	5.0	0	4.9	0	5.0
REW	0	4.9	0	5.0	0	5.0	0	0	5.0	5.0	0	4.9	0	5.0

REF. NO.	IC6011								
MODE	1	2	3	4	5	6	7	8	9
STOP	5.0	0	0	4.9	0	4.9	0	0	5.0
PLAY	5.0	0	0	4.9	0	4.9	0	0	5.0
REC	5.0	0	0	4.9	0	4.9	0	0	5.0
F.F	5.0	0	0	4.9	0	4.9	0	0	5.0
REW	5.0	0	0	4.9	0	4.9	0	0	5.0

REF. NO.	IC6012													
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
STOP	0	5.0	5.0	2.5	4.5	2.5	0.4	0	2.5	2.5	4.7	0	4.9	0.7
PLAY	1.6	5.0	5.0	2.5	4.5	2.5	1.4	1.5	2.5	2.5	4.7	0	4.9	1.7
REC	1.6	4.7	5.0	2.5	4.2	2.5	1.4	1.5	2.5	2.5	4.7	0	4.9	1.7
F.F	1.6	5.0	5.0	2.5	4.5	2.5	1.4	1.5	2.5	2.5	4.7	0	4.9	1.7
REW	1.6	5.0	5.0	2.5	4.5	2.5	1.4	1.5	2.5	2.5	4.7	0	4.9	1.7

REF. NO.	IC6013													
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
STOP	5.0	0	4.9	0	4.9	4.8	0	0.1	4.9	0	5.0	0	5.0	5.0
PLAY	5.0	0	4.9	0	4.9	4.8	0	0.1	4.9	0	5.0	0	5.0	5.0
REC	5.0	0	4.9	0	0.6	4.8	0	0.1	0.6	0	4.7	4.8	0	5.0
F.F	5.0	0	4.9	0	4.9	4.8	0	0.1	4.9	0	5.0	0	5.0	5.0
REW	5.0	0	4.9	0	4.9	4.8	0	0.1	4.9	0	5.0	0	5.0	5.0

REF. NO.	IC6014								
MODE	1	2	3	4	5	6	7	8	9
STOP	5.0	0	0	3.6	0	3.6	0	0	5.0
PLAY	5.0	0	0	0.1	0	0.1	0	0	5.0
REC	5.0	0	0	3.6	0	3.6	0	0	5.0
F.F	5.0	0	0	3.6	0	3.6	0	0	5.0
REW	5.0	0	0	3.6	0	3.6	0	0	5.0

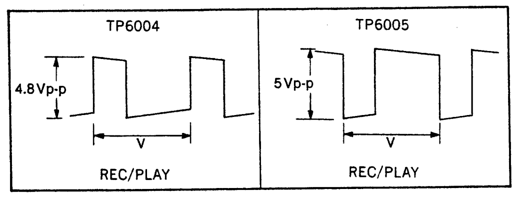
REF. NO.	IC6015													
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
STOP	4.8	0	0	0	3.8	0.1	0	0	5.0	4.2	5.0	4.9	0	5.0
PLAY	4.8	0	1.6	0	3.9	0.1	0	0	2.5	0.1	1.7	2.8	2.5	5.0
REC	4.8	0	1.6	0	3.9	0.1	0	0	2.5	4.2	1.7	4.9	0	5.0
F.F	4.8	0	1.6	0	3.9	0.1	0	0	2.5	4.2	1.7	4.9	0	5.0
REW	4.8	0	1.6	0	3.9	0.1	0	0	2.5	4.2	1.7	4.9	0	5.0

REF. NO.	IC6016													
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
STOP	0	0.7	5.0	5.0	0.7	0	0	5.0	0	4.9	4.9	0	5.0	5.0
PLAY	2.5	1.7	4.3	4.3	1.7	1.9	0	4.3	0	4.9	4.9	0	4.3	5.0
REC	2.5	1.7	4.3	4.3	1.7	1.9	0	4.3	0	4.9	4.9	0	4.3	5.0
F.F	2.5	1.7	4.3	4.3	1.7	1.9	0	4.3	0	4.9	4.9	0	4.3	5.0
REW	2.5	1.7	4.3	4.3	1.7	1.9	0	4.3	0	4.9	4.9	0	4.3	5.0

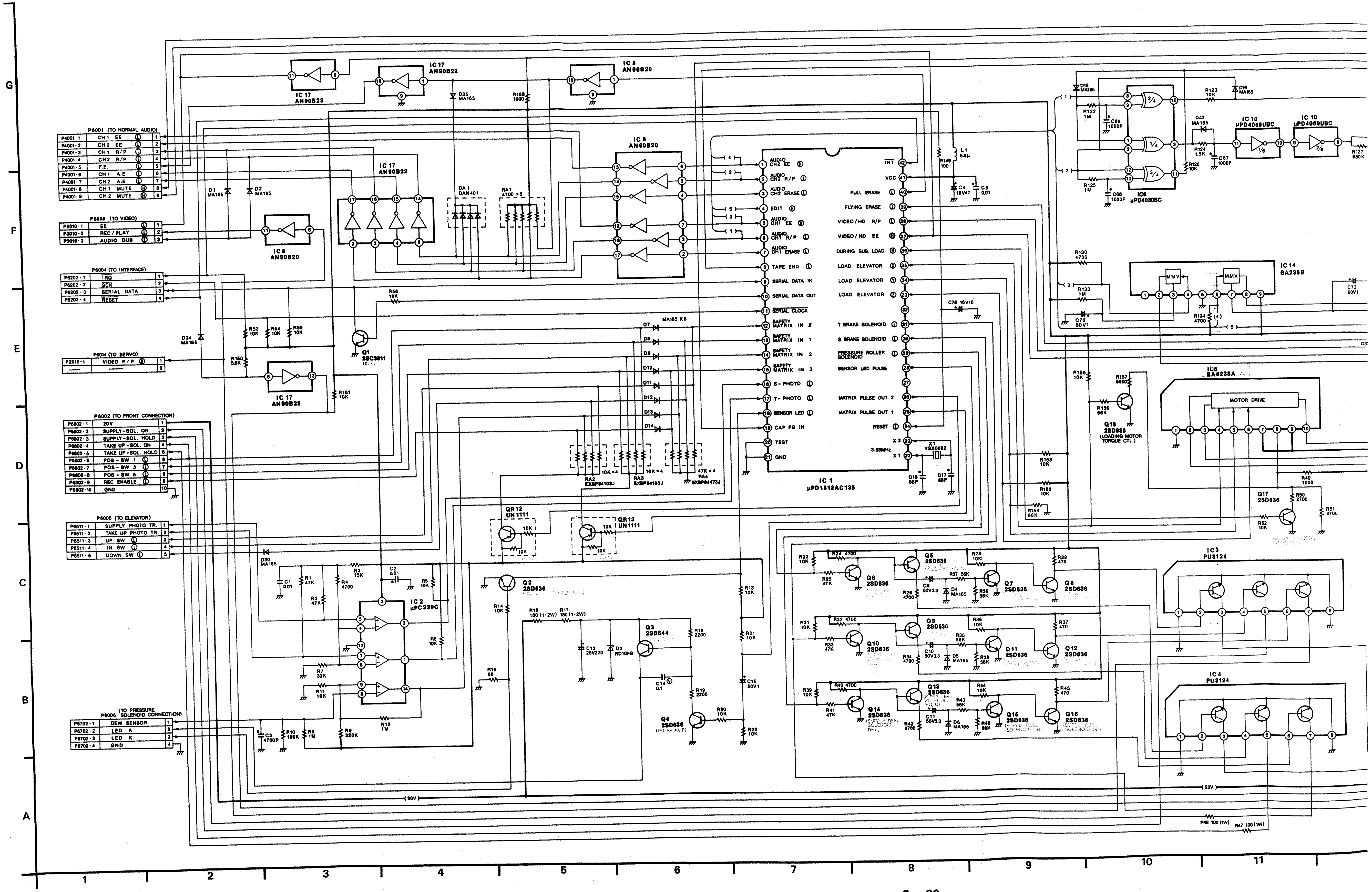
REF. NO.	IC6017																	
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
STOP	0.1	0.1	0.1	0.1	0.1	2.7	0	4.2	0	0	0.4	0.4	0.1	11.9	11.9	11.9	11.9	11.9
PLAY	0.1	0.1	0.1	0.1	0.1	2.7	0	0.1	0	0	10.5	0.5	0.1	11.9	11.9	11.9	11.9	11.9
REC	2.8	0.1	2.8	0.1	2.8	2.7	0	4.2	0	0	0.4	0.6	0.1	0.1	11.9	0.1	11.9	0.1
F.F	0.1	0.1	0.1	0.1	0.1	2.7	0	4.2	0	0	0.4	0.5	0.1	11.9	11.9	11.9	11.9	11.9
REW	0.1	0.1	0.1	0.1	0.1	2.7	0	4.2	0	0	0.4	0.6	0.1	11.9	11.9	11.9	11.9	11.9

REF. NO.	IC6020							
MODE	1	2	3	4	5	6	7	8
STOP	5.0	2.5	4.8	0	4.5	2.5	5.0	5.0
PLAY	1.6	2.5	1.5	0	4.5	2.5	5.0	5.0
REC	1.6	2.5	1.5	0	4.2	2.5	4.7	5.0
F.F	1.6	2.5	1.5	0	4.5	2.5	5.0	5.0
REW	1.6	2.5	1.5	0	4.5	2.5	5.0	5.0

REF. NO.	IC6021													
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
STOP	5.0	0	5.0	0	4.9	4.8	0	0.1	4.9	0	5.0	0	5.0	5.0
PLAY	5.0	0	1.6	0	4.9	4.8	0	0.1	4.9	0	5.0	0	5.0	5.0
REC	5.0	0	1.6	0	0.6	4.8	0	0.1	0.6	0	4.7	4.8	0	5.0
F.F	5.0	0	1.6	0	4.9	4.8	0	0.1	4.9	0	5.0	0	5.0	5.0
REW	5.0	0	1.6	0	4.9	4.8	0	0.1	4.9	0	5.0	0	5.0	5.0

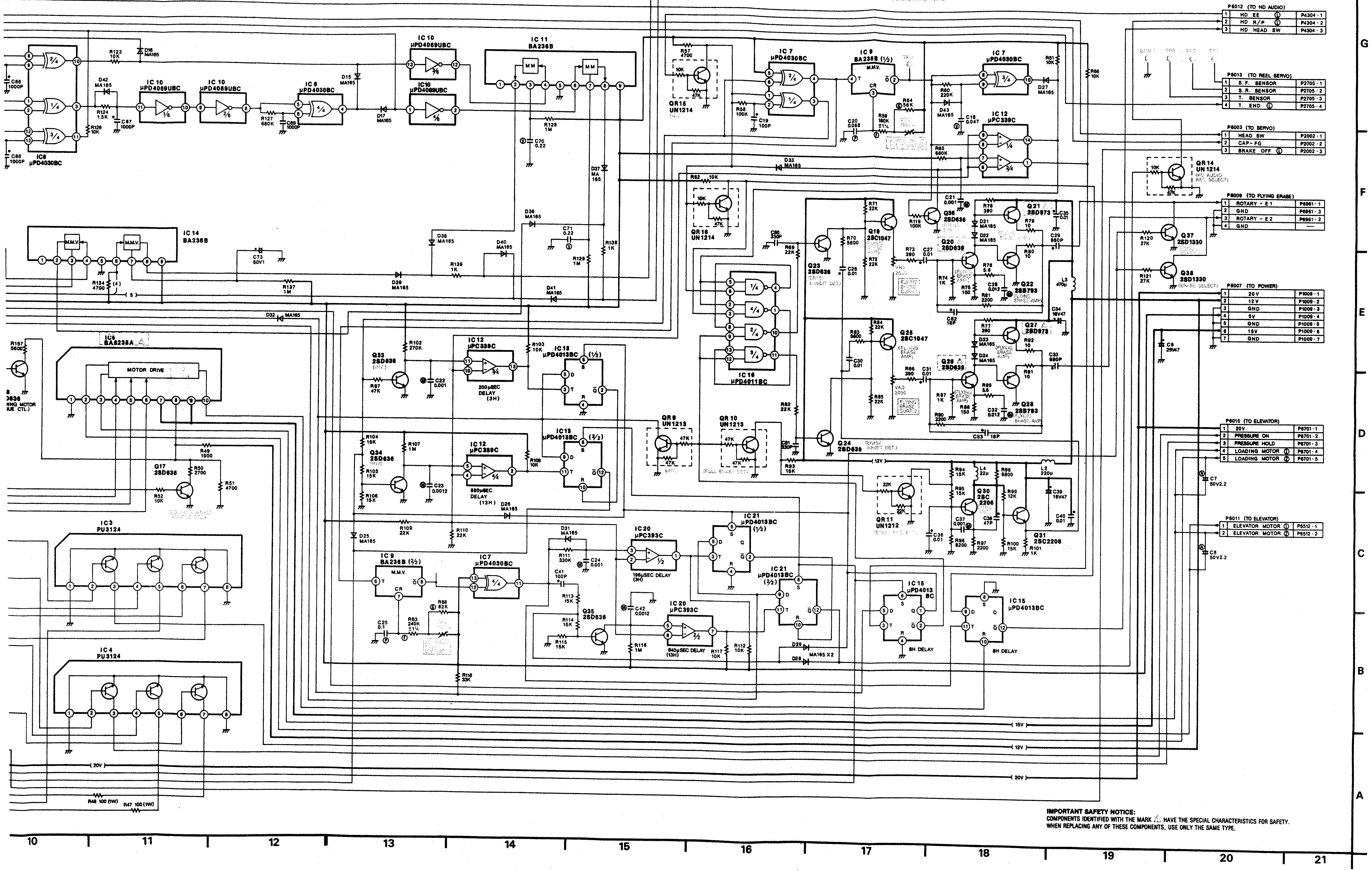


SYSTEM CONTROL SCHEMATIC DIAGRAM



G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
P6001 (TO NORMAL AUDIO)
P4001-1 CH1 EE Ⓛ 1
P4001-2 CH2 EE Ⓛ 2
P4001-3 CH1 R/P Ⓛ 3
P4001-4 CH2 R/P Ⓛ 4
P4001-5 F.E. 5
P4001-6 CH1 A.E Ⓛ 6
P4001-7 CH2 A.E Ⓛ 7
P4001-8 CH1 MUTE Ⓗ 8
P4001-9 CH2 MUTE Ⓗ 9
P6008 (TO VIDEO)
P3010-1 EE Ⓛ 1
P3010-2 REC/PLAY Ⓛ 2
P3010-3 AUDIO DUB Ⓛ 3
P6004 (TO INTERFACE)
P6202-1 IRQ 1
P6202-2 SCK 2
P6202-3 SERIAL DATA 3
P6202-4 RESET 4
P6014 (TO SERVO)
P2015-1 VIDEO R/P Ⓗ 1
2
P6002 (TO FRONT CONNECTION)
P6802-1 20V 1
P6802-2 SUPPLY-SOL. ON 2
P6802-3 SUPPLY-SOL. HOLD 3
P6802-4 TAKE UP-SOL. ON 4
P6802-5 TAKE UP-SOL. HOLD 5
P6802-6 POS-SW 1 Ⓛ 6
P6802-7 POS-SW 3 Ⓛ 7
P6802-8 POS-SW 5 Ⓛ 8
P6802-9 REC ENABLE Ⓛ 9
P6802-10 GND 10
P6005 (TO ELEVATOR)
P6511-1 SUPPLY PHOTO TR. 1
P6511-2 TAKE UP PHOTO TR. 2
P6511-3 UP SW Ⓛ 3
P6511-4 IN SW Ⓛ 4
P6511-5 DOWN SW Ⓛ 5
(TO PRESSURE SOLENOID CONNECTION) P6006
P6702-1 DEW SENSOR 1
P6702-2 LED A 2
P6702-3 LED K 3
P6702-4 GND 4
IC17 AN90B22
IC8 AN90B20
D35 MA165
R158 1000
D1 MA165
D2 MA165
DA1 DAN401
RA1 4700×5
D34 MA165
R53 10K
R54 10K
R55 10K
R56 10K
R150 5.6K
Q1 2SC3811
R151 10K
D7 … D14
MA165 X8
RA2 EXBP84103J
RA3 EXBP84103J
RA4 EXBP84473J
10K×4
47K×4
QR12 UN1111
QR13 UN1111
D30 MA165
C1 0.01
R1 47K
R2 47K
R3 15K
R4 4700
C2 0.01
R5 10K
R6 10K
IC2 μPC339C
R7 33K
R11 10K
R12 1M
C3 4700P
R10 180K
R8 1M
R9 220K
Q2 2SD636
R14 10K
R15 68
R16 180 (1/2W)
R17 180 (1/2W)
C13 25V220
D3 RD10FB
Q3 2SB644
R18 2200
C14 0.1
R19 2200
Q4 2SD636 (PULSE AMP)
R20 10K
R13 10K
R21 10K
C15 50V1
R22 10K
(20V)
AUDIO CH2 EE Ⓗ
AUDIO CH2 R/P Ⓛ
AUDIO CH2 ERASE Ⓛ
EDIT Ⓗ
AUDIO CH1 EE Ⓗ
AUDIO CH1 R/P Ⓛ
AUDIO CH1 ERASE Ⓛ
TAPE END Ⓛ
SERIAL DATA IN
SERIAL DATA OUT
SERIAL CLOCK
SAFETY MATRIX IN 0
SAFETY MATRIX IN 1
SAFETY MATRIX IN 2
SAFETY MATRIX IN 3
S-PHOTO Ⓛ
T-PHOTO Ⓛ
SENSOR LED Ⓛ
CAP FG IN
TEST
GND
INT
VCC
FULL ERASE Ⓛ
FLYING ERASE Ⓛ
VIDEO/HD R/P Ⓛ
VIDEO/HD EE Ⓗ
DURING SUB. LOAD Ⓗ
LOAD ELEVATOR Ⓞ
LOAD ELEVATOR Ⓣ
LOAD ELEVATOR Ⓓ
T. BRAKE SOLENOID Ⓛ
S. BRAKE SOLENOID Ⓛ
PRESSURE ROLLER SOLENOID Ⓛ
SENSOR LED PULSE
MATRIX PULSE OUT 2
MATRIX PULSE OUT 1
RESET Ⓛ
X2
X1
3.58MHz
IC1 μPD1512AC135
R149 100
L1 5.6μ
C4 16V47
C5 0.01
C78 16V10
X1 VSX0082
C16 68P
C17 68P
D18 MA165
D16 MA165
R122 1M
C66 1000P
R123 10K
D42 MA165
R124 1.5K
R126 10K
C67 1000P
R125 1M
C68 1000P
IC6 μPD4030BC
IC10 μPD4069UBC
R127 680K
R130 4700
R133 1M
C72 50V1
R134 4700
IC14 BA236B
M.M.V
C73 50V1
R155 10K
R157 5600
R156 56K
Q18 2SD636 (LOADING MOTOR TORQUE CTL.)
IC5 BA6238A
MOTOR DRIVE
R153 10K
R152 10K
R154 56K
R49 1000
Q17 2SD636
R50 2700
R51 4700
R52 10K
R23 10K
R24 4700
R25 47K
Q5 2SD636
Q6 2SD636
R26 4700
C9 50V3.3
D4 MA165
R27 56K
R28 10K
R30 56K
Q7 2SD636
R29 470
Q8 2SD636
R31 10K
R32 4700
R33 47K
Q9 2SD636
Q10 2SD636
R34 4700
C10 50V3.3
D5 MA165
R35 56K
R36 10K
R38 56K
Q11 2SD636
R37 470
Q12 2SD636
R39 10K
R40 4700
R41 47K
Q13 2SD636
Q14 2SD636 (SUPPLY REEL SOLENOID DET.)
R42 4700
C11 50V3.3
D6 MA165
R43 56K
R44 10K
R46 56K
Q15 2SD636 (SUPPLY REEL SOLENOID ON)
R45 470
Q16 2SD636 (SUPPLY REEL SOLENOID ON)
IC3 PU3124
IC4 PU3124
(20V)
R48 100 (1W)
R47 100 (1W)

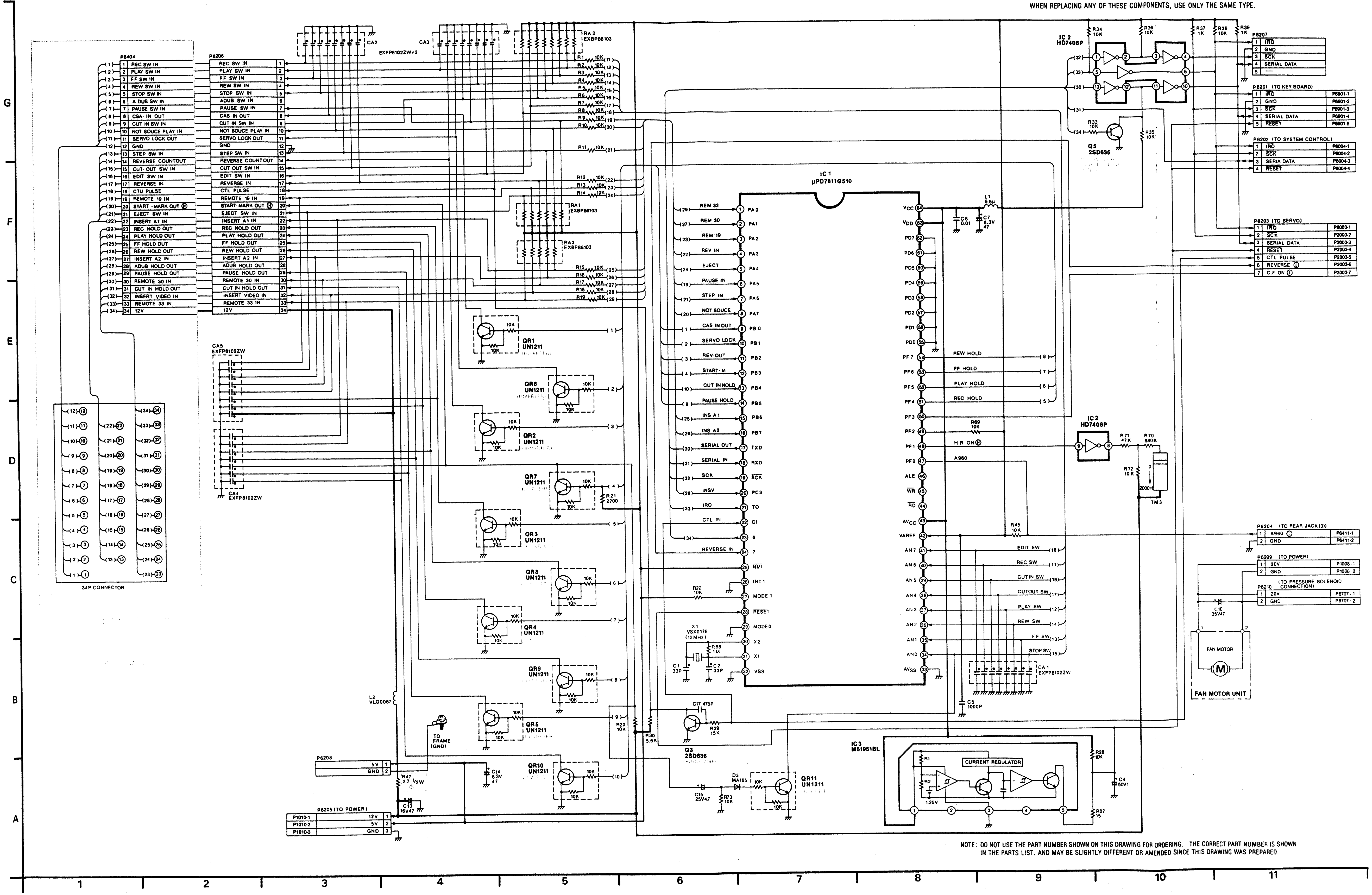
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.


P6012 (TO HD AUDIO)
1 HD EE Ⓛ P4304 - 1
2 HD R/P Ⓛ P4304 - 2
3 HD HEAD SW P4304 - 3
P6013 (TO REEL SERVO)
1 S.F. SENSOR P2705 - 1
2 S.R. SENSOR P2705 - 2
3 T. SENSOR P2705 - 3
4 T. END Ⓛ P2705 - 4
P6003 (TO SERVO)
1 HEAD SW P2002 - 1
2 CAP-FG P2002 - 2
3 BRAKE OFF Ⓛ P2002 - 3
P6009 (TO FLYING ERASE)
1 ROTARY - E 1 P6961 - 1
2 GND P6961 - 3
3 ROTARY - E 2 P6961 - 2
4 GND —
P6007 (TO POWER)
1 20 V P1009 - 1
2 12 V P1009 - 2
3 GND P1009 - 3
4 5V P1009 - 4
5 GND P1009 - 5
6 15V P1009 - 6
7 GND P1009 - 7
P6010 (TO ELEVATOR)
1 20V P6701 - 1
2 PRESSURE ON P6701 - 2
3 PRESSURE HOLD P6701 - 3
4 LOADING MOTOR ① P6701 - 4
5 LOADING MOTOR ② P6701 - 5
P6011 (TO ELEVATOR)
1 ELEVATOR MOTOR ① P6512 - 1
2 ELEVATOR MOTOR ② P6512 - 2
IC6 μPD4030BC
IC10 μPD4069UBC
IC11 BA236B
IC14 BA236B
IC5 BA6238A
MOTOR DRIVE
IC3 PU3124
IC4 PU3124
IC7 μPD4030BC
IC8 BA236B (½)
IC9 BA236B (2/2)
IC12 μPC339C
IC13 μPD4013BC
IC15 μPD4013BC
IC16 μPD4011BC
IC20 μPC393C
IC21 μPD4013BC
200μSEC DELAY (3H)
880μSEC DELAY (13H)
196μSEC DELAY (3H)
840μSEC DELAY (13H)
8H DELAY
QR9 UN1213
QR10 UN1213
QR11 UN1212
QR14 UN1214
(HD AUDIO REC SELECT)
QR15 UN1214
QR16 UN1214
Q17 2SD636
Q19 2SC1047
Q20 2SD639
Q21 2SD973
Q22 2SB793
Q23 2SD636
Q24 2SD636
Q25 2SC1047
Q27 2SD973
Q28 2SB793
Q29 2SD639
Q30 2SC2206
Q31 2SC2206
Q33 2SD636
Q34 2SD636
Q35 2SD636
Q36 2SD636
Q37 2SD1330
Q38 2SD1330
(ERASE SELECT)
(FLYING ERASE AMP)
C7 50V2.2
C8 50V2.2
(15V)
(12V)
(20V)
R48 100 (1W)
R47 100 (1W)
GND1 TP3 TP2 TP1
A B C D E F G
10 11 12 13 14 15 16 17 18 19 20 21

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.
WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.

INTERFACE SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.
WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.


P6404
P6206
REC SW IN
PLAY SW IN
FF SW IN
REW SW IN
STOP SW IN
A DUB SW IN
PAUSE SW IN
CAS-IN OUT
CUT IN SW IN
NOT SOUCE PLAY IN
SERVO LOCK OUT
GND
STEP SW IN
REVERSE COUNTOUT
CUT OUT SW IN
EDIT SW IN
REVERSE IN
CTU PULSE
REMOTE 19 IN
START-MARK OUT
EJECT SW IN
INSERT A1 IN
REC HOLD OUT
PLAY HOLD OUT
FF HOLD OUT
REW HOLD OUT
INSERT A2 IN
ADUB HOLD OUT
PAUSE HOLD OUT
REMOTE 30 IN
CUT IN HOLD OUT
INSERT VIDEO IN
REMOTE 33 IN
12V
34P CONNECTOR
CA2
CA3
EXFP8102ZW×2
RA2
EXBP88103
RA1
EXBP88103
RA3
EXBP88103
CA5
EXFP8102ZW
CA4
EXFP8102ZW
QR1 UN1211
QR6 UN1211
QR2 UN1211
QR7 UN1211
R21 2700
QR3 UN1211
QR8 UN1211
QR4 UN1211
QR9 UN1211
QR5 UN1211
QR10 UN1211
L2 VLQ0067
TO FRAME (GND)
P6208
5V
GND
R47 2.7 ½W
C14 6.3V 47
C13 16V47
P6205 (TO POWER)
P1010-1 12V
P1010-2 5V
P1010-3 GND
R20 10K
R30 5.6K
Q3 2SD636
C17 470P
R29 15K
C15 25V47
D3 MA165
R73 10K
QR11 UN1211
IC1 μPD7811G510
REM 33
REM 30
REM 19
REV IN
EJECT
PAUSE IN
STEP IN
NOT SOUCE
CAS IN OUT
SERVO LOCK
REV-OUT
START-M
CUT IN HOLD
PAUSE HOLD
INS A1
INS A2
SERIAL OUT
SERIAL IN
SCK
INSV
IRQ
CTL IN
REVERSE IN
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
TXD
RXD
SCK
PC3
TO
CI
NMI
INT1
MODE 1
RESET
MODE 0
X2
X1
VSS
VCC
VDD
PD7
PD6
PD5
PD4
PD3
PD2
PD1
PD0
PF7
PF6
PF5
PF4
PF3
PF2
PF1
PF0
ALE
WR
RD
AVCC
VAREF
AN7
AN6
AN5
AN4
AN3
AN2
AN1
AN0
AVSS
R22 10K
X1 VSX0178 (12MHz)
R68 1M
C1 33P
C2 33P
C6 0.01
C7 6.3V 47
L1 5.6μ
REW HOLD
FF HOLD
PLAY HOLD
REC HOLD
R69 10K
H.R ON
A960
R45 10K
EDIT SW
REC SW
CUTIN SW
CUTOUT SW
PLAY SW
REW SW
F.F SW
STOP SW
CA1 EXFP8102ZW
C5 1000P
IC3 M51951BL
CURRENT REGULATOR
R1
R2
1.25V
R28 10K
R27 15
C4 50V1
IC2 HD7406P
R34 10K
R36 10K
R37 1K
R38 10K
R39 1K
R33 10K
R35 10K
Q5 2SD636
R71 47K
R70 680K
R72 10K
TM3
P6207
IRQ
GND
SCK
SERIAL DATA
P6201 (TO KEY BOARD)
RESET
P6801-1
P6801-2
P6801-3
P6801-4
P6801-5
P6202 (TO SYSTEM CONTROL)
SERIA DATA
P6004-1
P6004-2
P6004-3
P6004-4
P6203 (TO SERVO)
CTL PULSE
REVERSE
C.F ON
P2003-1
P2003-2
P2003-3
P2003-4
P2003-5
P2003-6
P2003-7
P6204 (TO REAR JACK (3))
A960
P6411-1
P6411-2
P6209 (TO POWER)
20V
P1006-1
P1006-2
(TO PRESSURE SOLENOID CONNECTION)
P6210
P6707-1
P6707-2
C16 35V47
FAN MOTOR
FAN MOTOR UNIT
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

INTERFACE IC

REF. NO. / MODE	1	2
STOP	4.9	4.9
PLAY	4.9	4.9
REC	4.9	4.9
F.F	4.9	4.9
REW	4.9	4.9
REF. NO. / MODE	**21**	**22**
STOP	0.3	0.1
PLAY	0.3	0.1
REC	0.3	0.1
F.F	0.3	0.9
REW	0.3	0.9
REF. NO. / MODE	**41**	**42**
STOP	4.9	4.9
PLAY	4.9	4.9
REC	4.9	4.9
F.F	4.9	4.9
REW	4.9	4.9
REF. NO. / MODE	**61**	**62**
STOP	0	0
PLAY	0	0
REC	0	0
F.F	0	0
REW	0	0
REF. NO. / MODE	**1**	**2**
STOP	3.7	0.1
PLAY	3.7	0.1
REC	3.7	0.1
F.F	3.7	0.1
REW	3.7	0.1
REF. NO. / MODE	**1**	**2**
STOP	4.8	0
PLAY	4.8	0
REC	4.8	0
F.F	4.8	0
REW	4.8	0

INTERFACE TI

REF. NO.	Q6203	
MODE	E	C
STOP	0	11.9
PLAY	0	11.9
REC	0	11.9
F.F	0	9.2
REW	0	9.4
REF. NO.	**QR6201**	
MODE	E	C
STOP	0	0
PLAY	0	0
REC	0	0
F.F	0	0
REW	0	0
REF. NO.	**QR6207**	
MODE	E	C
STOP	0	0
PLAY	0	0
REC	0	0
F.F	0	0
REW	0	0

NTERFACE ICs DC VOLTAGE CHART

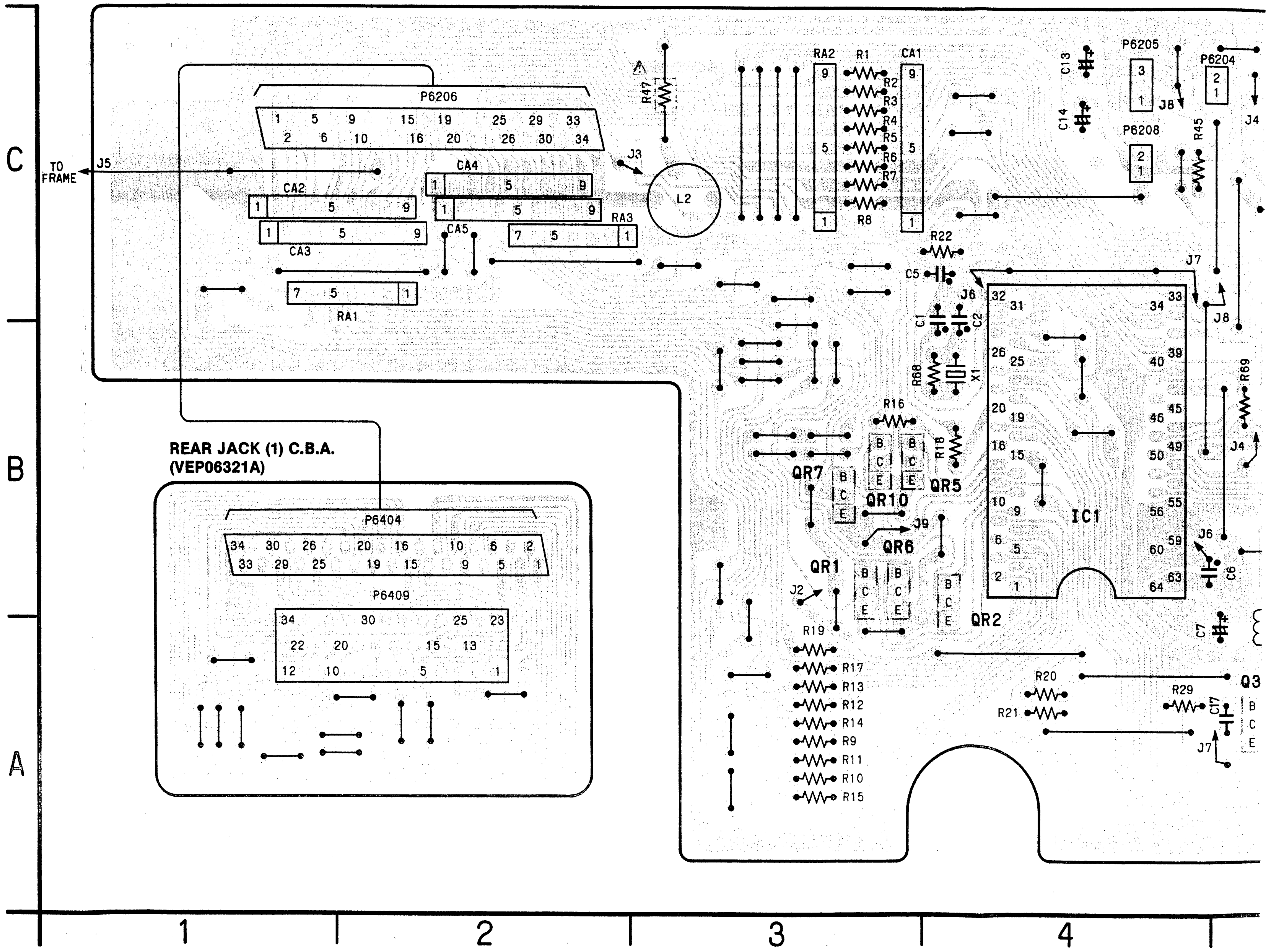
REF. NO.	IC6201																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	3.4	0	0	4.1	0	0	4.9	4.9	3.0	3.6	3.7	4.9
PLAY	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	3.4	3.4	0	4.1	0	0	4.9	4.9	3.0	3.6	3.7	4.9
REC	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	3.4	3.4	0	4.1	0	0	4.9	4.9	3.0	3.6	3.7	4.9
F.F	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	3.4	0	0	4.1	0	0	4.9	4.9	3.0	3.6	3.7	4.9
REW	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	3.4	0	3.4	4.1	0	0	4.9	4.9	3.0	3.6	3.7	4.9
REF. NO.	IC6201																			
MODE	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
STOP	0.3	0.1	2.1	4.9	4.9	0	3.3	4.8	0	0.7	1.4	0	0	4.9	4.9	4.9	4.9	4.9	4.9	4.9
PLAY	0.3	0.1	2.1	4.9	4.9	0	3.3	4.8	0	0.7	1.4	0	0	4.9	4.9	4.9	4.9	4.9	4.9	4.9
REC	0.3	0.1	2.1	4.9	4.9	0	3.3	4.8	0	0.7	1.4	0	0	4.9	4.9	4.9	4.9	4.9	4.9	4.9
F.F	0.3	0.9	2.1	4.9	4.9	0	3.3	4.8	0	0.7	1.4	0	0	4.9	4.9	4.9	4.9	4.9	4.9	4.9
REW	0.3	0.9	2.1	4.9	4.9	0	3.3	4.8	0	0.7	1.4	0	0	4.9	4.9	4.9	4.9	4.9	4.9	4.9
REF. NO.	IC6201																			
MODE	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
STOP	4.9	4.9	4.8	3.5	3.5	0.7	4.9	0.1	4.9	0	0	0	0	0	0	0	0	0	0	0
PLAY	4.9	4.9	4.8	3.5	3.5	0.7	4.9	3.3	4.9	0	0	3.1	0	0	0	0	0	0	0	0
REC	4.9	4.9	4.8	3.5	3.5	0.7	4.9	3.3	4.9	0	3.1	3.1	0	0	0	0	0	0	0	0
F.F	4.9	4.9	4.8	3.5	3.9	0.7	4.9	3.3	4.9	0	0	0	0	0	0	0	0	0	0	0
REW	4.9	4.9	4.8	3.5	3.5	0.7	4.9	3.4	4.9	0	0	0	0	3.1	0	0	0	0	0	0
REF. NO.	IC6201																			
MODE	61	62	63	64																
STOP	0	0	4.8	4.8																
PLAY	0	0	4.8	4.8																
REC	0	0	4.8	4.8																
F.F	0	0	4.8	4.8																
REW	0	0	4.8	4.8																
REF. NO.	IC6202																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14						
STOP	3.7	0.1	0.1	4.7	0.3	4.7	0	11.9	0.1	3.5	0.9	0.9	3.0	4.9						
PLAY	3.7	0.1	0.1	4.7	0.3	4.7	0	0.1	3.4	3.5	0.9	0.9	3.0	4.9						
REC	3.7	0.1	0.1	4.7	0.3	4.7	0	0.1	3.4	3.7	0.9	0.9	3.0	4.9						
F.F	3.7	0.1	0.1	4.7	0.3	4.7	0	0.1	3.3	3.7	0.9	0.9	3.0	4.9						
REW	3.7	0.1	0.1	4.7	0.3	4.7	0	0.1	3.3	3.7	0.9	0.9	3.0	4.9						
REF. NO.	IC6203																			
MODE	1	2	3	4	5															
STOP	4.8	0	0	0	4.8															
PLAY	4.8	0	0	0	4.8															
REC	4.8	0	0	0	4.8															
F.F	4.8	0	0	0	4.8															
REW	4.8	0	0	0	4.8															

NTERFACE TRANSISTORs DC VOLTAGE CHART

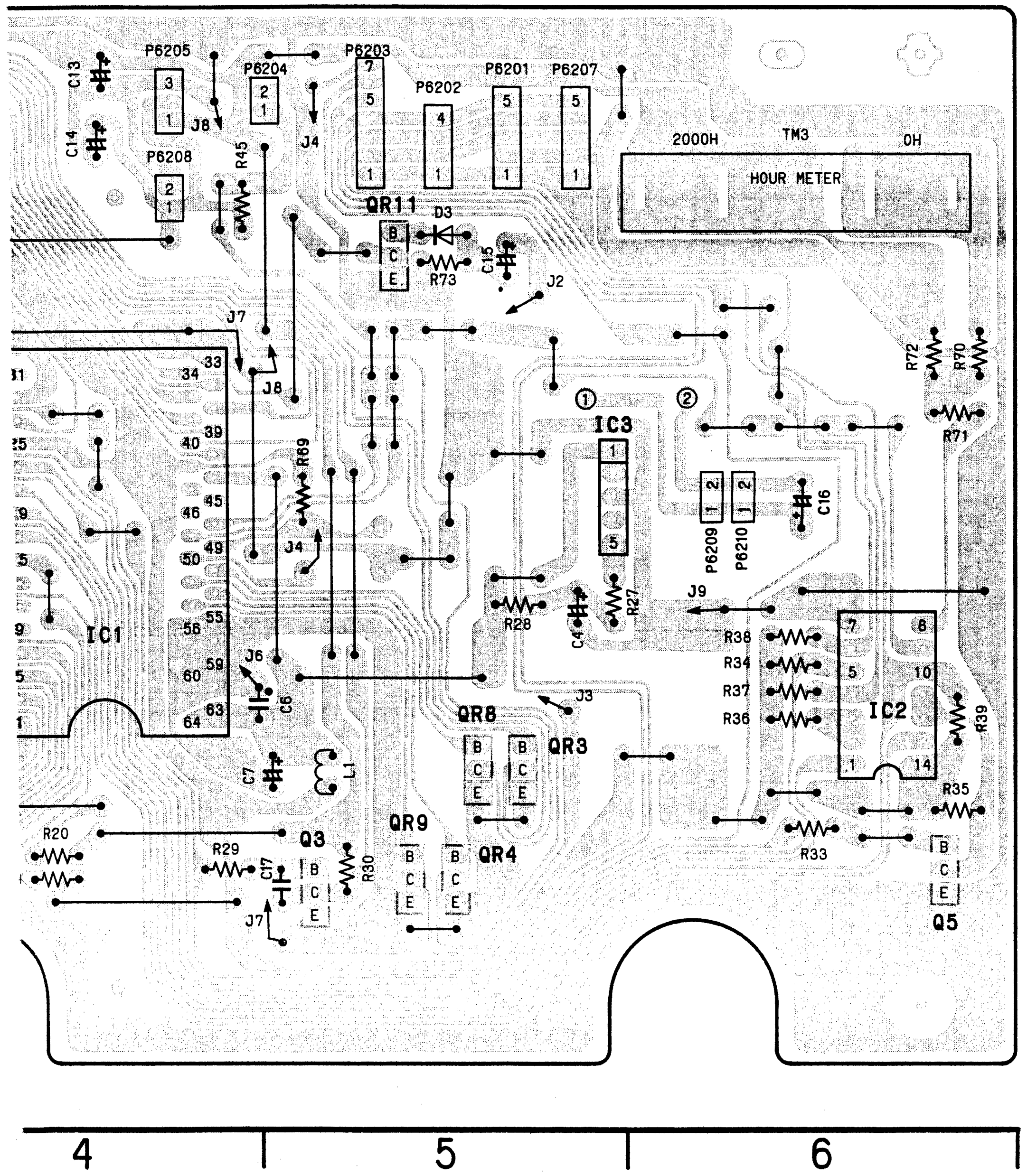
REF. NO.	Q6203			Q6205														
MODE	E	C	B	E	C	B												
STOP	0	11.9	0.1	0	0.9	0.4												
PLAY	0	11.9	0.1	0	0.9	0.4												
REC	0	11.9	0.1	0	0.9	0.4												
F.F	0	9.2	0.2	0	0.9	0.4												
REW	0	9.4	0.2	0	0.9	0.4												
REF. NO.	QR6201			QR6202			QR6203			QR6204			QR6205			QR6206		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	0	3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PLAY	0	0	3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.4
REC	0	0	3.4	0	0	0	0	0	3.1	0	0	0	0	0	0	0	0	3.4
F.F	0	0	3.4	0	0.2	0	0	0	0	0	0	3.1	0	0	0	0	0	0
REW	0	0	3.4	0	0	3.4	0	0	0	0	0	0	0	0	0	0	0	0
REF. NO.	QR6207			QR6208			QR6209			QR6210			QR6211					
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B			
STOP	0	0	4.1	0	0	0	0	0	0	0	0	0	0	4.9	0			
PLAY	0	0	4.1	0	0	3.1	0	0	0	0	0	0	0	4.9	0			
REC	0	0	4.1	0	0	3.1	0	0	0	0	0	0	0	4.9	0			
F.F	0	0	4.1	0	0	0	0	0	0	0	0	0	0	4.9	0			
REW	0	0	4.1	0	0	0	0	0	3.1	0	0	0	0	4.9	0			

INTERFACE C.B.A. (VEP06391A)

REF.NO.6200 SERIES


C
B
A
1
2
3
4
TO FRAME
J5
P6206
CA1
CA2
CA3
CA4
CA5
RA1
RA2
RA3
L2
J3
R47
R1
R2
R3
R4
R5
R6
R7
R8
C13
C14
P6205
P6204
P6208
J8
J4
R45
R22
C5
J6
J7
C1
C2
R68
X1
R16
R18
R69
QR7
QR10
QR5
QR6
QR1
QR2
J9
J2
IC1
C6
C7
R19
R17
R13
R12
R14
R9
R11
R10
R15
R20
R21
R29
C17
Q3
REAR JACK (1) C.B.A.
(VEP06321A)
P6404
P6409

200 SERIES

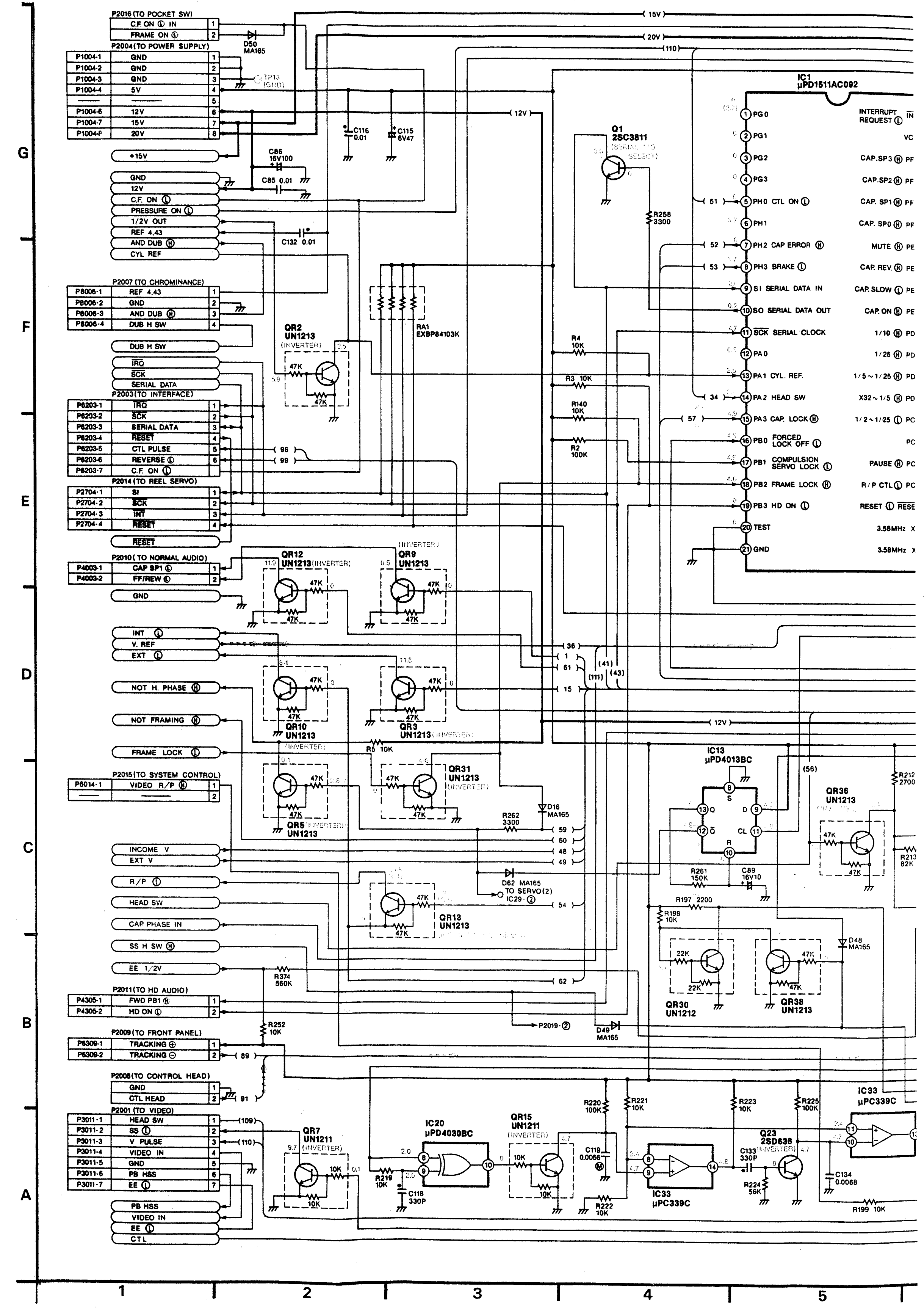

P6205
P6204
P6203
P6202
P6201
P6207
P6208
C13
C14
J8
R45
J4
QR11
D3
R73
C15
J2
2000H
TM3
0H
HOUR METER
J7
J8
IC3
①
②
P6209
P6210
C16
R72
R70
R71
R69
J4
R28
R27
C4
J9
R38
R34
R37
R36
IC2
R39
IC1
J6
C6
J3
QR8
QR3
C7
L1
R35
R20
R29
C17
Q3
R30
QR9
QR4
R33
Q5
J7
4
5
6

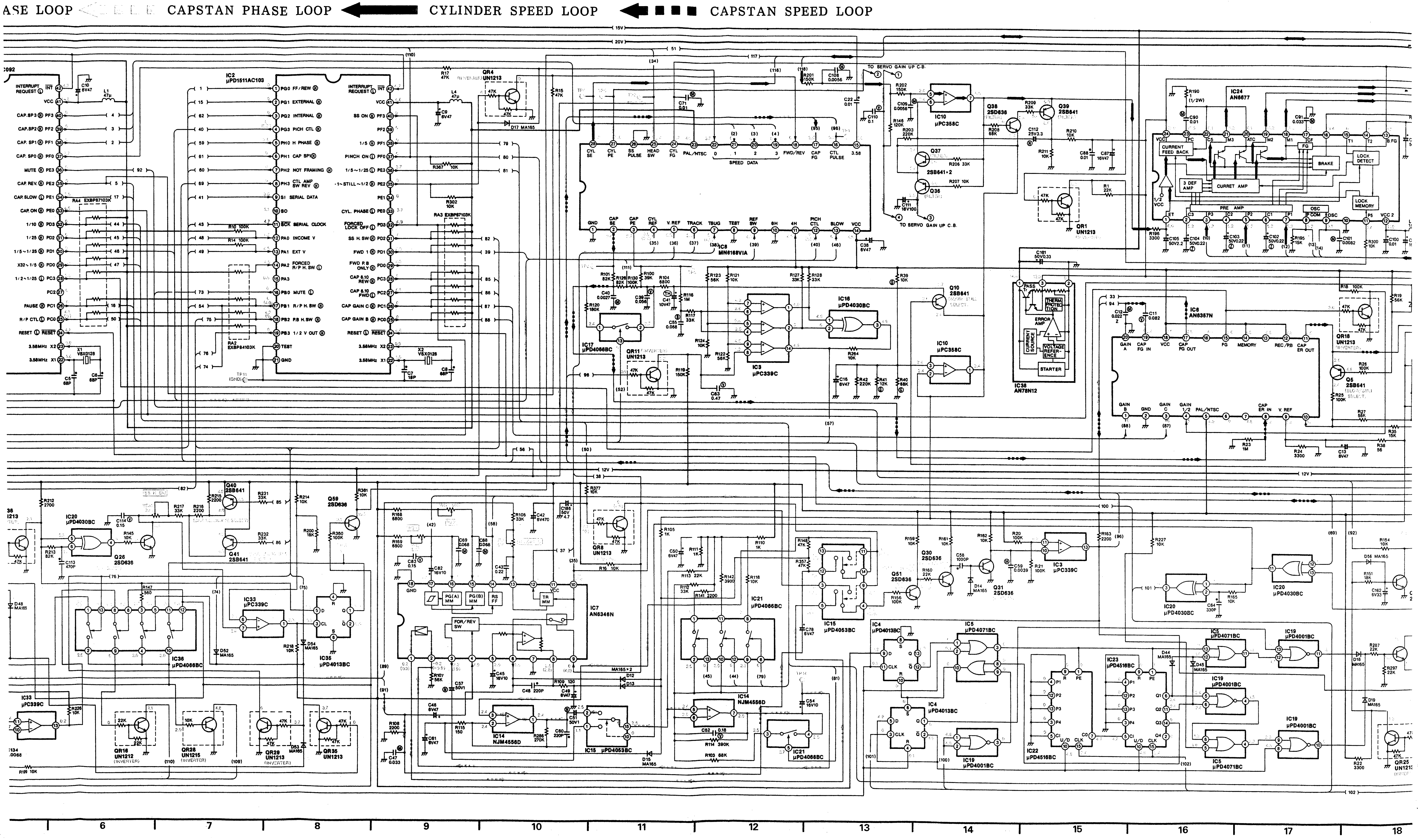
Interface C.B.A.	
Transistor	
Q6203	A-5
Q6205	A-6
Transistor & Resistor	
QR6201	B-3
QR6202	B-4
QR6203	B-5
QR6204	A-5
QR6205	B-3
QR6206	B-3
QR6207	B-3
QR6208	B-5
QR6209	A-5
QR6210	B-3
QR6211	C-5
Integrated Circuit	
IC6201	B-4
IC6202	B-6
IC6203	B-5

ADDRESS INFORMATION

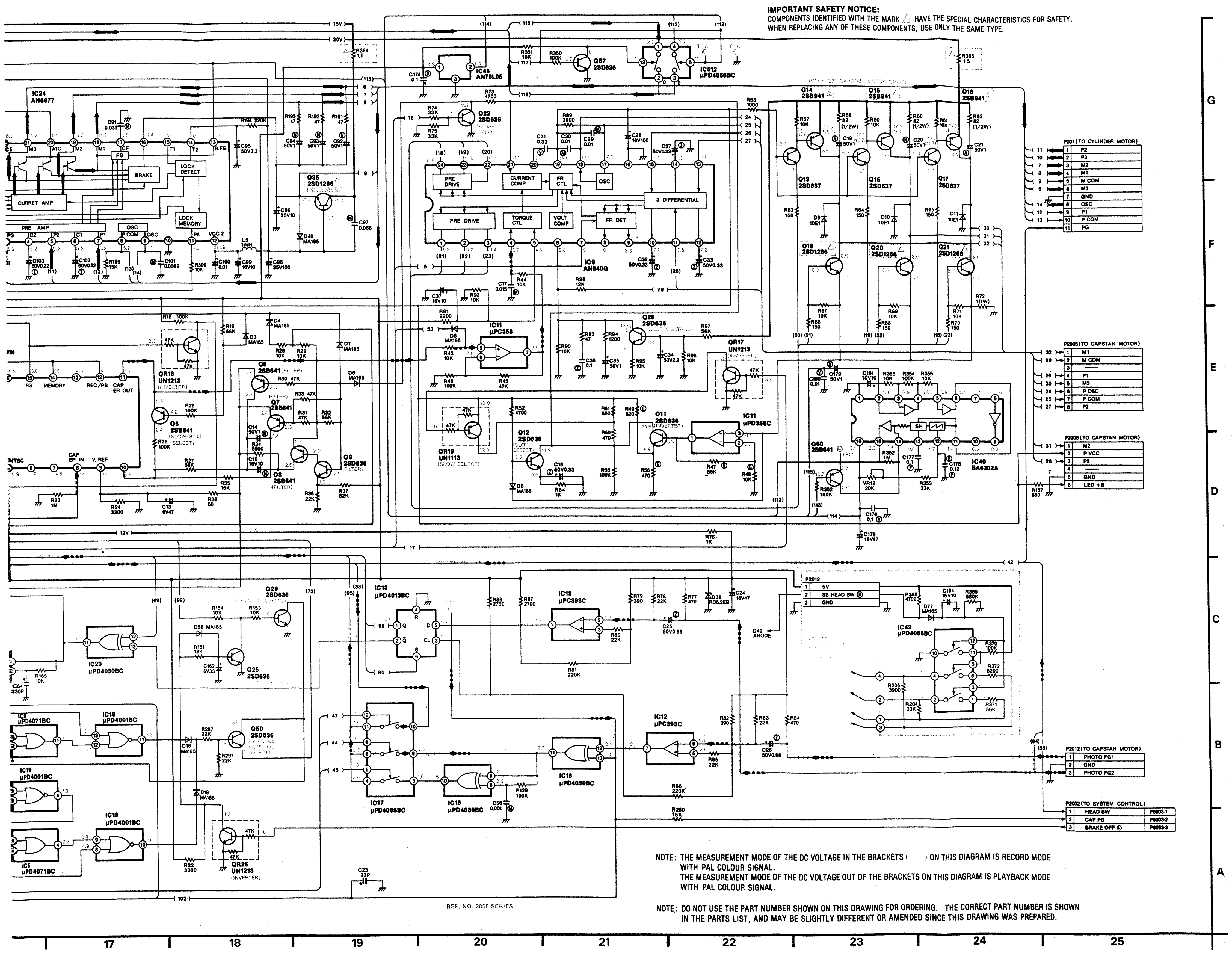
SERVO (1) SCHEMATIC DIAGRAM

CYLINDER PHASE L


P2016 (TO POCKET SW)
C.F. ON ① IN
FRAME ON ①
P2004 (TO POWER SUPPLY)
GND
5V
12V
15V
20V
D50 MA165
15V
20V
12V
C116 0.01
C115 6V47
IC1 µPD1511AC092
PG0
PG1
PG2
PG3
PH0 CTL ON ①
PH1
PH2 CAP ERROR Ⓗ
PH3 BRAKE ①
SI SERIAL DATA IN
SO SERIAL DATA OUT
SCK SERIAL CLOCK
PA0
PA1 CYL. REF.
PA2 HEAD SW
PA3 CAP. LOCK Ⓗ
PB0 FORCED LOCK OFF ①
PB1 COMPULSION SERVO LOCK ①
PB2 FRAME LOCK Ⓗ
PB3 HD ON ①
TEST
GND
INTERRUPT REQUEST ①
CAP. SP3 Ⓗ
CAP. SP2 Ⓗ
CAP. SP1 Ⓗ
CAP. SP0 Ⓗ
MUTE Ⓗ
CAP. REV. Ⓗ
CAP. SLOW ①
CAP. ON Ⓗ
1/10 Ⓗ
1/25 Ⓗ
1/5～1/25 Ⓗ
X32～1/5 Ⓗ
1/2～1/25 ①
PAUSE Ⓗ
R/P CTL ①
RESET ①
3.58MHz
Q1 2SC3811
R258 3300
+15V
GND
12V
C.F. ON ①
PRESSURE ON ①
1/2V OUT
REF 4.43
AND DUB Ⓗ
CYL REF
C85 16V100
C85 0.01
C132 0.01
P2007 (TO CHROMINANCE)
REF 4.43
GND
AND DUB Ⓗ
DUB H SW
QR2 UN1213 (INVERTER)
RA1 EXBP84103K
R4 10K
R3 10K
R140 10K
R2 100K
DUB H SW
IRQ
SCK
SERIAL DATA
P2003 (TO INTERFACE)
IRQ
SCK
SERIAL DATA
RESET
CTL PULSE
REVERSE ①
C.F. ON ①
P2014 (TO REEL SERVO)
SI
SCK
INT
RESET
RESET
P2010 (TO NORMAL AUDIO)
CAP SP1 ①
FF/REW ①
GND
QR12 UN1213 (INVERTER)
QR9 UN1213
INT ①
V. REF
EXT ①
NOT H. PHASE Ⓗ
NOT FRAMING Ⓗ
FRAME LOCK ①
QR10 UN1213
QR3 UN1213
R5 10K
P2015 (TO SYSTEM CONTROL)
VIDEO R/P Ⓗ
QR5 UN1213
QR31 UN1213 (INVERTER)
R262 3300
D16 MA165
INCOME V
EXT V
R/P ①
HEAD SW
CAP PHASE IN
SS H SW Ⓗ
EE 1/2V
D62 MA165 TO SERVO (2) IC29-②
QR13 UN1213
R374 560K
IC13 µPD4013BC
R261 150K
C89 16V10
R197 2200
R198 10K
QR36 UN1213
R212 2700
R213 82K
QR30 UN1212
QR38 UN1213
D48 MA165
P2011 (TO HD AUDIO)
FWD PB1 Ⓗ
HD ON ①
R252 10K
P2019-②
D49 MA165
P2009 (TO FRONT PANEL)
TRACKING ⊕
TRACKING ⊖
P2008 (TO CONTROL HEAD)
GND
CTL HEAD
P2001 (TO VIDEO)
HEAD SW
SS ①
V PULSE
VIDEO IN
GND
PB HSS
EE ①
QR7 UN1211 (INVERTER)
IC20 µPD4030BC
QR15 UN1211 (INVERTER)
R219 10K
C118 330P
R220 100K
R221 10K
C119 0.0056
R222 10K
IC33 µPC339C
R223 10K
R225 100K
Q23 2SD636
C133 330P
R224 56K
C134 0.0068
R199 10K
PB HSS
VIDEO IN
EE ①
CTL
G
F
E
D
C
B
A
1
2
3
4
5

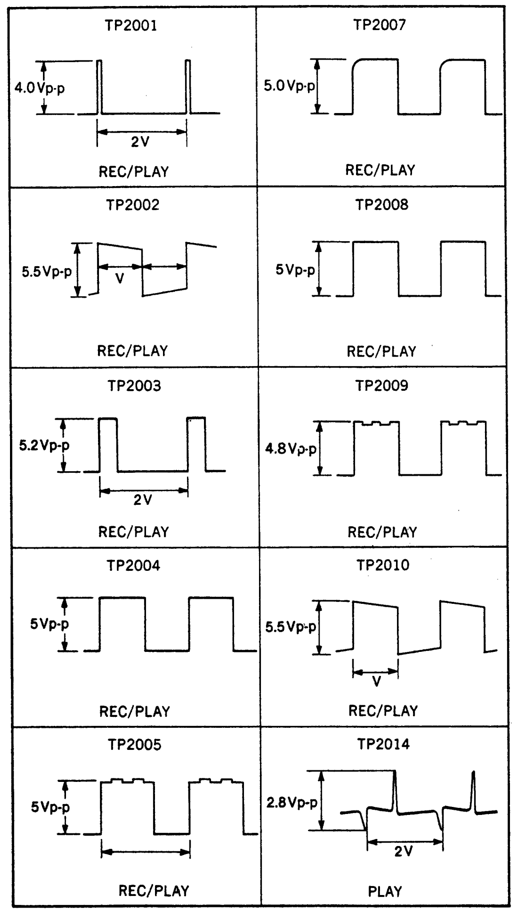

ASE LOOP
CAPSTAN PHASE LOOP
CYLINDER SPEED LOOP
CAPSTAN SPEED LOOP
15V
20V
12V
IC2 μPD1511AC103
IC8 MN6168VIA
IC10 μPC358C
IC24 AN6677
IC16 μPD4030BC
IC3 μPC339C
IC17 μPD4066BC
IC38 AN78N12
IC6 AN6357N
IC20 μPD4030BC
IC33 μPC339C
IC36 μPD4066BC
IC35 μPD4013BC
IC7 AN6346N
IC14 NJM4556D
IC15 μPD4053BC
IC21 μPD4066BC
IC4 μPD4013BC
IC5 μPD4071BC
IC19 μPD4001BC
IC23 μPD4516BC
IC22 μPD4516BC
QR4 UN1213
QR11 UN1213
QR1 UN1213
QR8 UN1213
QR18 UN1213
QR16 UN1212
QR28 UN1215
QR29 UN1213
QR35 UN1213
QR25 UN1213
Q38 2SD636
Q39 2SB641
Q37 2SB641×2
Q36
Q10 2SB641
Q5 2SB641
Q40 2SB641
Q41 2SB641
Q59 2SD636
Q26 2SD636
Q30 2SD636
Q31 2SD636
Q51 2SD636
TO SERVO GAIN UP C.B.
X1 VSX0128
X2 VSX0128
RA4 EXBP87103K
RA3 EXBP87103K
RA2 EXBP84103K
6
7
8
9
10
11
12
13
14
15
16
17
18

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.
WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.

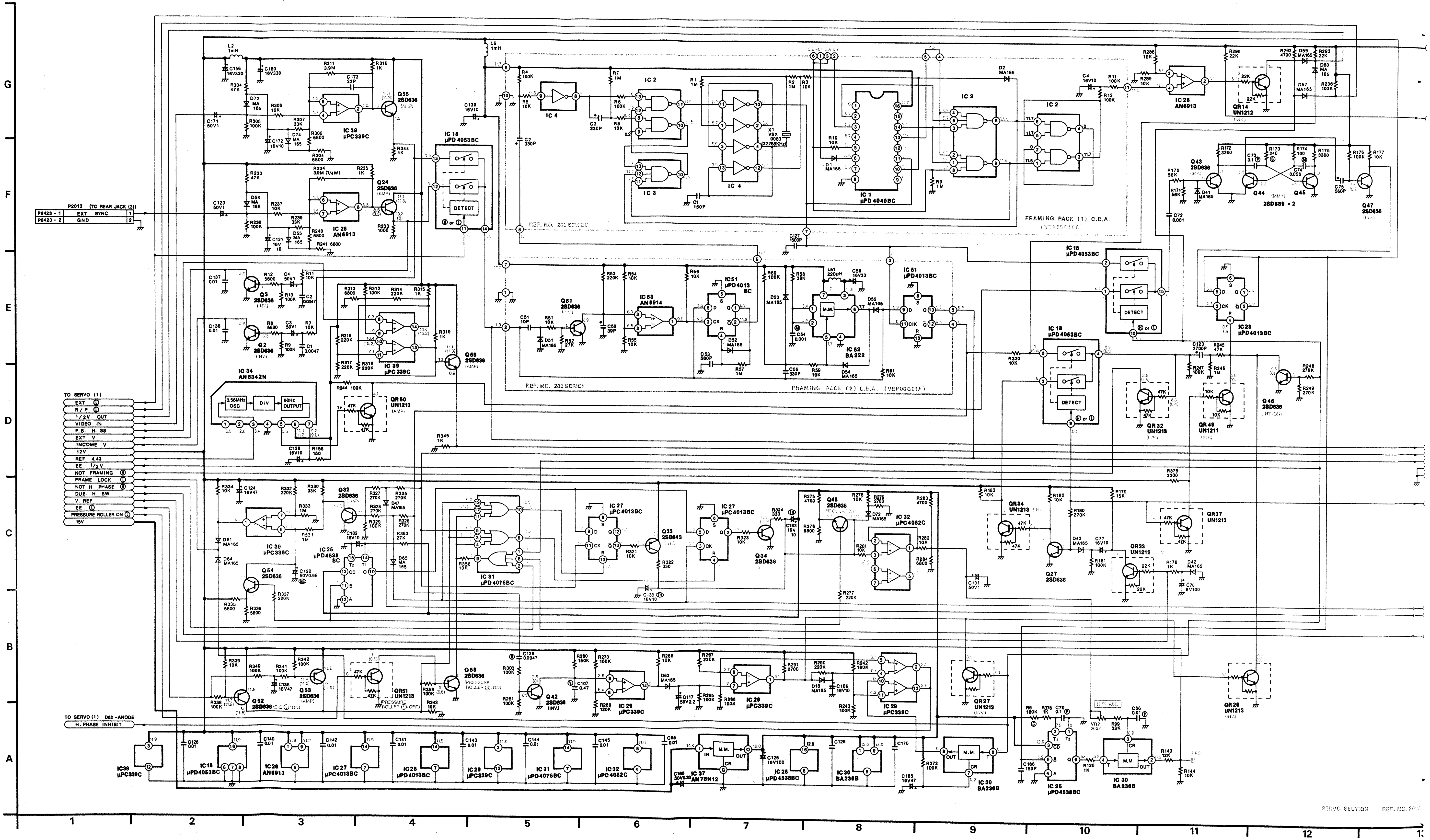

IC24 AN6677
CURRET AMP
PRE AMP
BRAKE
LOCK DETECT
LOCK MEMORY
OSC
Q35 2SD1266
IC48 AN78L05
Q57 2SD636
IC512 µPD4066BC
Q22 2SD636
IC9 AN6640G
PRE DRIVE
CURRENT COMP.
FR CTL
3 DIFFERENTIAL
TORQUE CTL
VOLT COMP
FR DET
Q14 2SB941
Q16 2SB941
Q18 2SB941
Q13 2SD637
Q15 2SD637
Q17 2SD637
Q19 2SD1266
Q20 2SD1266
Q21 2SD1266
P001 (TO CYLINDER MOTOR)
P2
P3
M2
M1
M COM
M3
GND
OSC
P1
P COM
PG
IC11 µPC358
Q28 2SD636
QR17 UN1213
QR18 UN1213
Q5 2SB641
Q6 2SB641
Q7 2SB641
Q8 2SB641
Q9 2SD636
QR19 UN1113
Q12 2SD636
Q11 2SD636
IC11 µPD358C
Q60 2SB641
IC40 BA6302A
P2005 (TO CAPSTAN MOTOR)
P2006 (TO CAPSTAN MOTOR)
M COM
P OSC
LED +B
P VCC
IC13 µPD4013BC
Q29 2SD636
Q25 2SD636
IC20 µPD4030BC
IC12 µPC393C
P2019
5V
SS HEAD SW
IC42 µPD4066BC
IC5 µPD4071BC
IC19 µPD4001BC
Q50 2SD636
IC17 µPD4066BC
IC16 µPD4030BC
QR25 UN1213
P2012 (TO CAPSTAN MOTOR)
PHOTO FG1
PHOTO FG2
P2002 (TO SYSTEM CONTROL)
HEAD SW
CAP FG
BRAKE OFF
P6003-1
P6003-2
P6003-3
REF. NO. 2000 SERIES
G
F
E
D
C
B
A
17
18
19
20
21
22
23
24
25

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS (   ) ON THIS DIAGRAM IS RECORD MODE WITH PAL COLOUR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL.

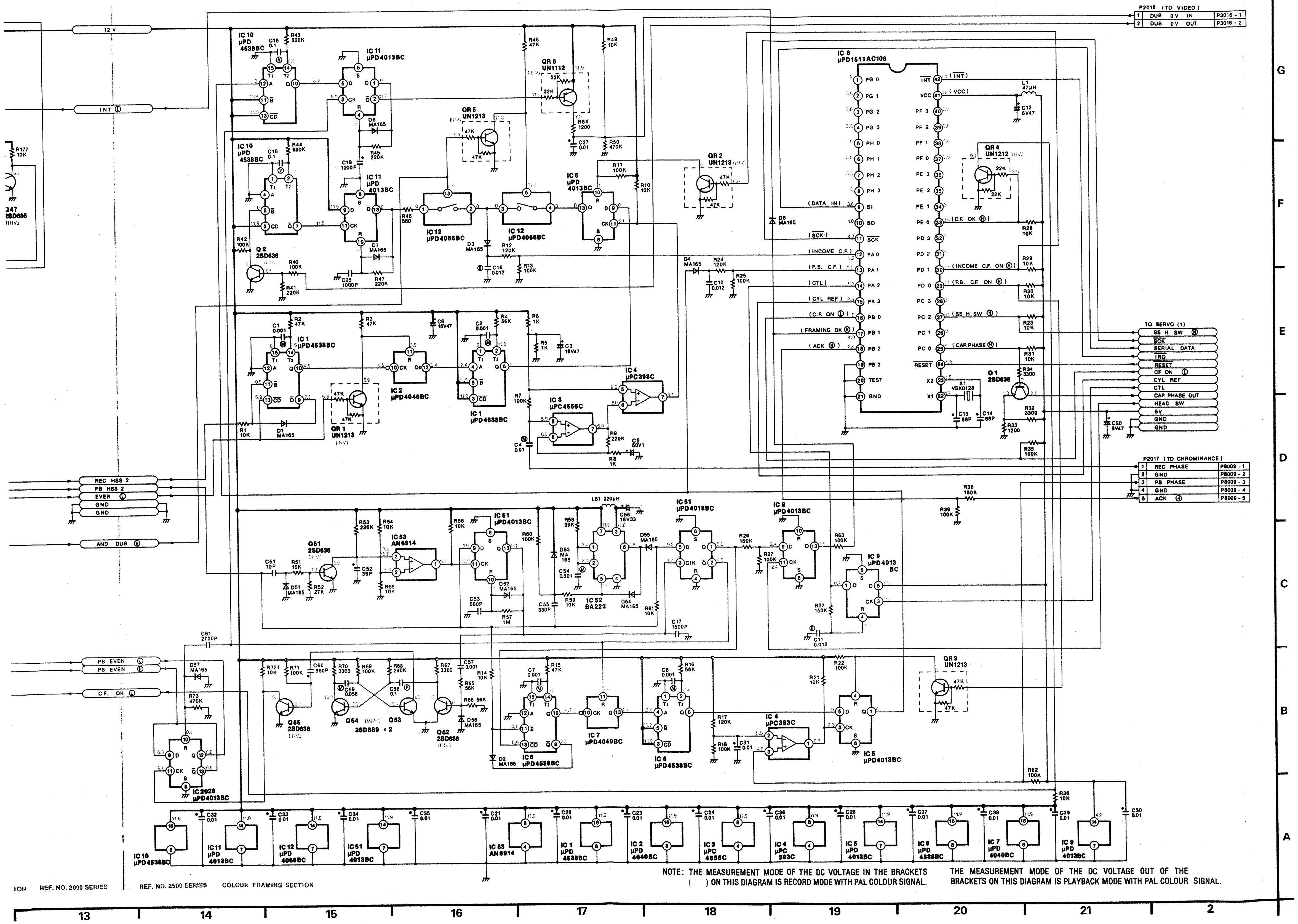
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.


TP2001
4.0Vp-p
2V
REC/PLAY
TP2007
5.0Vp-p
REC/PLAY
TP2002
5.5Vp-p
V
REC/PLAY
TP2008
5Vp-p
REC/PLAY
TP2003
5.2Vp-p
2V
REC/PLAY
TP2009
4.8Vp-p
REC/PLAY
TP2004
5Vp-p
REC/PLAY
TP2010
5.5Vp-p
V
REC/PLAY
TP2005
5Vp-p
REC/PLAY
TP2014
2.8Vp-p
2V
PLAY

SERVO (2) & COLOUR FRAMING SCHEMATIC DIAGRAM


G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
P2013 (TO REAR JACK (3))
P8423 - 1 EXT SYNC
P8423 - 2 GND
TO SERVO (1)
EXT ⓐ
R / P ⓑ
1/2V OUT
VIDEO IN
P.B. H. SS
EXT V
INCOME V
12V
REF 4.43
EE 1/2V
NOT FRAMING Ⓚ
FRAME LOCK Ⓛ
NOT H. PHASE Ⓜ
DUB. H SW
V. REF
EE ①
PRESSURE ROLLER ON ⓙ
15V
TO SERVO (1) D62 - ANODE
H. PHASE INHIBIT
IC 39 μPC339C
IC 26 AN6913
IC 18 μPD 4053BC
IC 4
IC 2
IC 3
IC 1 μPD 4040BC
X1 VSX 0083 (32768KHz)
REF. NO. 200 SERIES
FRAMING PACK (1) C.B.A. (VEP06060A)
FRAMING PACK (2) C.B.A. (VEP06061A)
IC 34 AN6342N
3.58MHz OSC
DIV
60Hz OUTPUT
IC 53 AN6914
IC 51 μPD4013 BC
IC 52 BA222
IC 28 μPD4013BC
IC 25 μPD4538 BC
IC 31 μPD4075BC
IC 27 μPC4013BC
IC 32 μPC4082C
IC 29 μPC339C
IC 30 BA236B
IC 37 AN78N12
QR14 UN1212
QR50 UN1213
QR51 UN1213
QR32 UN1213
QR49 UN1211
QR34 UN1213
QR33 UN1212
QR37 UN1213
QR27 UN1213
QR26 UN1213
Q55 2SD636
Q24 2SD636
Q3 2SD636
Q2 2SD636
Q56 2SD636
Q51 2SD636
Q43 2SD636
Q44 Q45 2SB889 × 2
Q47 2SD636
Q46 2SD636
Q32 2SD636
Q33 2SB643
Q34 2SD636
Q48 2SD636
Q54 2SD636
Q27 2SD636
Q52 2SD636
Q53 2SD636
Q58 2SD636
Q42 2SD636
DETECT
M.M.
H PHASE
TP3
SERVO SECTION REF. NO. 200

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

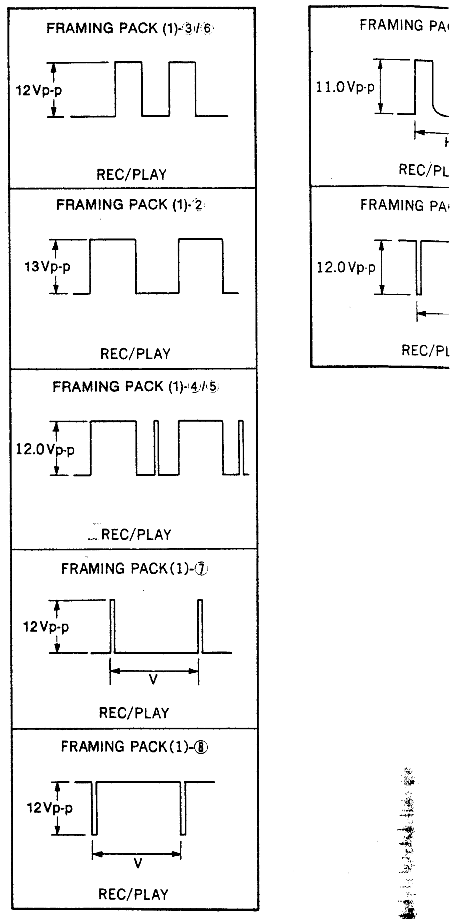

12 V
INT ①
REC HSS 2
PB HSS 2
EVEN ⓛ
GND
GND
AND DUB ⓡ
PB EVEN ⓘ
PB EVEN ⓗ
C.F. OK ①
IC 10 µPD 4538BC
IC 11 µPD 4013BC
QR 6 UN1112
QR 5 UN1213
IC 12 µPD4066BC
IC 5 µPD 4013BC
QR 2 UN1213
Q 2 2SD636
IC 1 µPD4538BC
IC 2 µPD4040BC
IC 3 µPC4556C
IC 4 µPC393C
QR 1 UN1213
IC 8 µPD1511AC108
QR 4 UN1212
Q 1 2SD636
X1 VSX0128
L1 47µH
P2018 (TO VIDEO)
1 DUB 0V IN P3016 - 1
2 DUB 0V OUT P3016 - 2
TO SERVO (1)
SS H SW
SCK
SERIAL DATA
IRQ
RESET
CF ON
CYL REF
CTL
CAP PHASE OUT
HEAD SW
5V
GND
GND
P2017 (TO CHROMINANCE)
1 REC PHASE P8009 - 1
2 GND P8009 - 2
3 PB PHASE P8009 - 3
4 GND P8009 - 4
5 ACK P8009 - 5
Q51 2SD636
IC 53 AN6914
IC 51 µPD4013BC
IC 52 BA222
IC 9 µPD4013BC
Q55 2SD636
Q54 Q53 2SD889 × 2
Q52 2SD636
IC 6 µPD4538BC
IC 7 µPD4040BC
IC 4 µPC393C
IC 5 µPD4013BC
QR 3 UN1213
IC 2028 µPD4013BC
IC 10 µPD4538BC
IC 11 µPD 4013BC
IC 12 µPD 4066BC
IC 51 µPD 4013BC
IC 53 AN6914
IC 1 µPD 4538BC
IC 2 µPD 4040BC
IC 3 µPC 4556C
IC 4 µPC 393C
IC 5 µPD 4013BC
IC 6 µPD 4538BC
IC 7 µPD 4040BC
IC 9 µPD 4013BC
G
F
E
D
C
B
A
13
14
15
16
17
18
19
20
21
2

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE WITH PAL COLOUR SIGNAL.

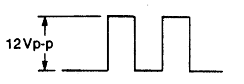
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL.

ION REF. NO. 2000 SERIES

REF. NO. 2500 SERIES COLOUR FRAMING SECTION

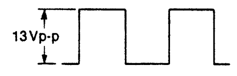

FRAMING PACK (1)-3/6
12Vp-p
REC/PLAY
FRAMING PACK (1)-2
13Vp-p
REC/PLAY
FRAMING PACK (1)-4/5
12.0Vp-p
REC/PLAY
FRAMING PACK (1)-7
12Vp-p
V
REC/PLAY
FRAMING PACK (1)-8
12Vp-p
V
REC/PLAY
FRAMING PA
11.0Vp-p
REC/PL
FRAMING PA
12.0Vp-p
REC/PL

FRAMING PACK (1)-③/⑥



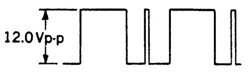
REC/PLAY

FRAMING PACK (1)-②



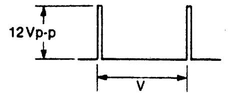
REC/PLAY

FRAMING PACK (1)-④/⑤



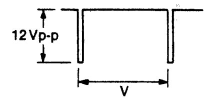
REC/PLAY

FRAMING PACK (1)-⑦



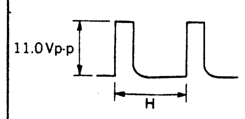
REC/PLAY

FRAMING PACK (1)-⑧



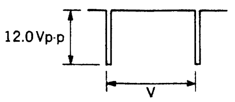
REC/PLAY

FRAMING PACK (2)-②



REC/PLAY

FRAMING PACK (2)-⑥



REC/PLAY

Servo C.B.A.

Transistors	
Q2001	C-4
Q2002	D-5
Q2003	D-4
Q2005	C-6
Q2006	C-6
Q2007	C-6
Q2008	C-6
Q2009	C-6
Q2010	D-6
Q2011	E-7
Q2012	E-7
Q2013	E-7
Q2014	E-7
Q2015	E-7
Q2016	E-7
Q2017	E-8
Q2018	E-8
Q2019	E-6
Q2020	E-6
Q2021	E-5
Q2022	B-4
Q2023	B-5
Q2024	D-3
Q2025	A-5
Q2026	A-7
Q2027	C-3
Q2028	E-8
Q2029	A-5
Q2030	B-7
Q2031	B-7
Q2032	C-2
Q2033	D-2
Q2034	D-2
Q2035	E-9
Q2036	D-6
Q2037	D-6
Q2038	E-6
Q2039	E-6
Q2040	D-5
Q2041	D-5
Q2042	D-2
Q2043	E-3
Q2044	E-3
Q2045	E-3
Q2046	D-2
Q2047	D-3
Q2048	D-1
Q2050	C-5
Q2051	B-7
Q2052	C-3
Q2053	C-3
Q2054	C-2
Q2055	D-4
Q2056	C-4
Q2057	E-1
Q2058	C-3
Q2059	D-6
Q2060	E-2
Q2501	A-3
Q2502	A-1
Q2551	B-2
Q2552	C-1
Q2553	C-1
Q2554	C-1
Q2555	D-1

Transistors & Resistors	
QR2001	B-5
QR2002	D-4
QR2003	D-6
QR2004	C-6
QR2005	D-6
QR2007	C-5
QR2008	A-4
QR2009	D-6
QR2010	D-6
QR2011	B-7
QR2012	D-6
QR2013	D-6
QR2014	D-3
QR2015	A-7
QR2016	C-6
QR2017	B-4
QR2018	D-6
QR2019	E-7
QR2025	A-5
QR2026	D-2
QR2027	D-2
QR2028	C-5
QR2029	B-5
QR2030	B-5
QR2031	C-4
QR2032	D-3
QR2033	C-3
QR2034	C-3
QR2035	B-5
QR2036	B-7
QR2037	D-3
QR2038	B-5
QR2049	D-3
QR2050	D-4
QR2051	A-1
QR2501	B-2
QR2502	B-3
QR2503	B-3
QR2504	B-3
QR2505	B-1
QR2506	B-2

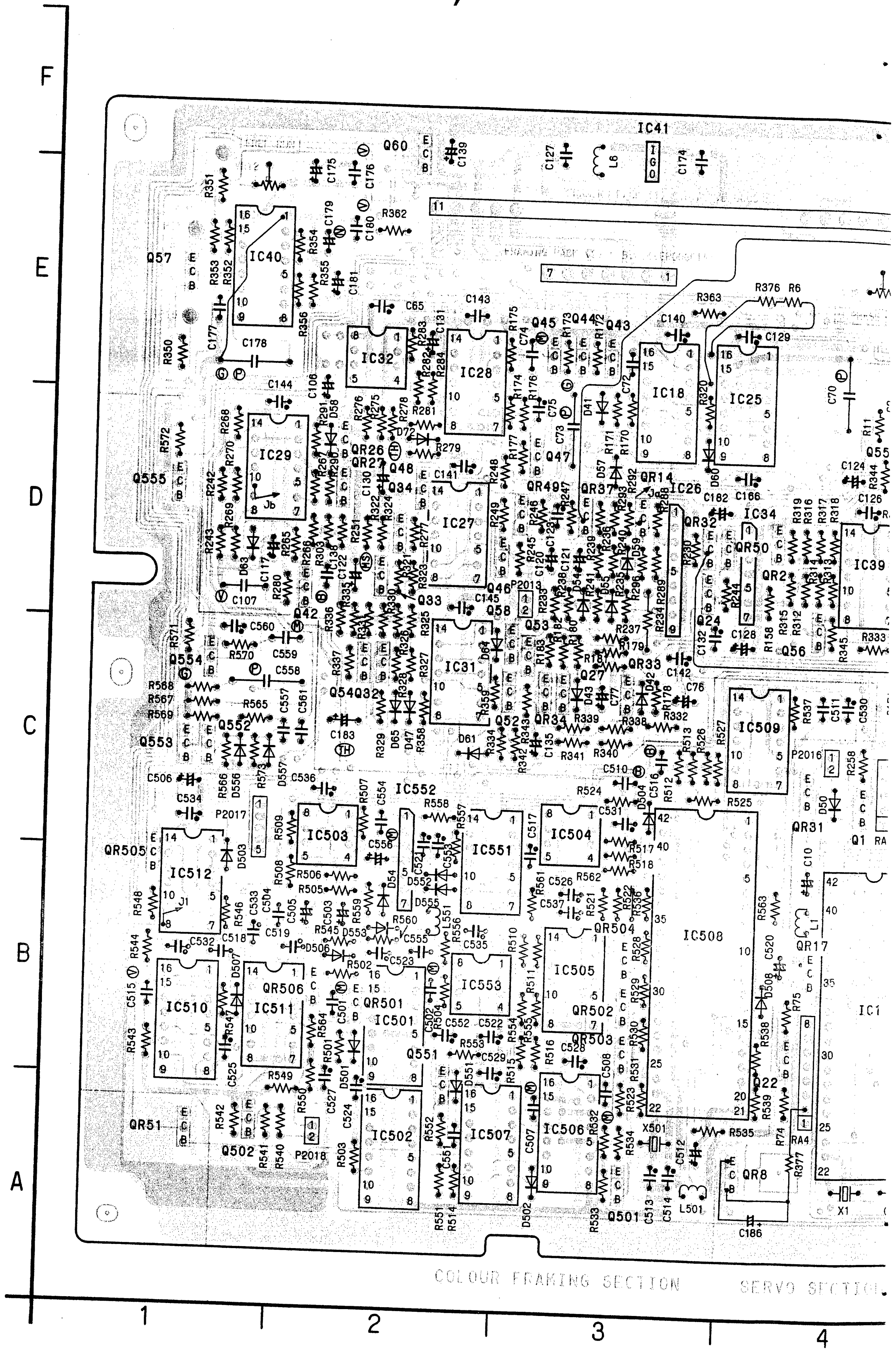
Integrated Circuits	
IC2001	B-4
IC2002	D-5
IC2003	C-7
IC2004	B-7
IC2005	B-6
IC2006	D-6
IC2007	B-8
IC2008	D-7
IC2009	D-8
IC2010	D-7
IC2011	E-6
IC2012	B-7
IC2013	B-6
IC2014	A-8
IC2015	B-8
IC2016	C-7
IC2017	B-7
IC2018	E-3
IC2019	B-6
IC2020	B-7
IC2021	A-7
IC2022	B-6
IC2023	B-6
IC2024	C-8
IC2025	E-4
IC2026	D-3
IC2027	D-1
IC2028	E-2
IC2029	D-1
IC2030	E-5
IC2031	C-2
IC2032	E-2
IC2033	B-5
IC2034	D-4
IC2035	B-5
IC2036	B-5
IC2037	E-5
IC2038	D-9
IC2039	D-4
IC2040	E-1
IC2041	E-3
IC2042	E-9
IC2501	B-2
IC2502	A-2
IC2503	C-2
IC2504	C-3
IC2505	B-3
IC2506	A-3
IC2507	A-3
IC2508	B-3
IC2509	C-4
IC2510	B-1
IC2511	B-2
IC2512	B-1
IC2551	C-2
IC2552	C-2
IC2553	B-2

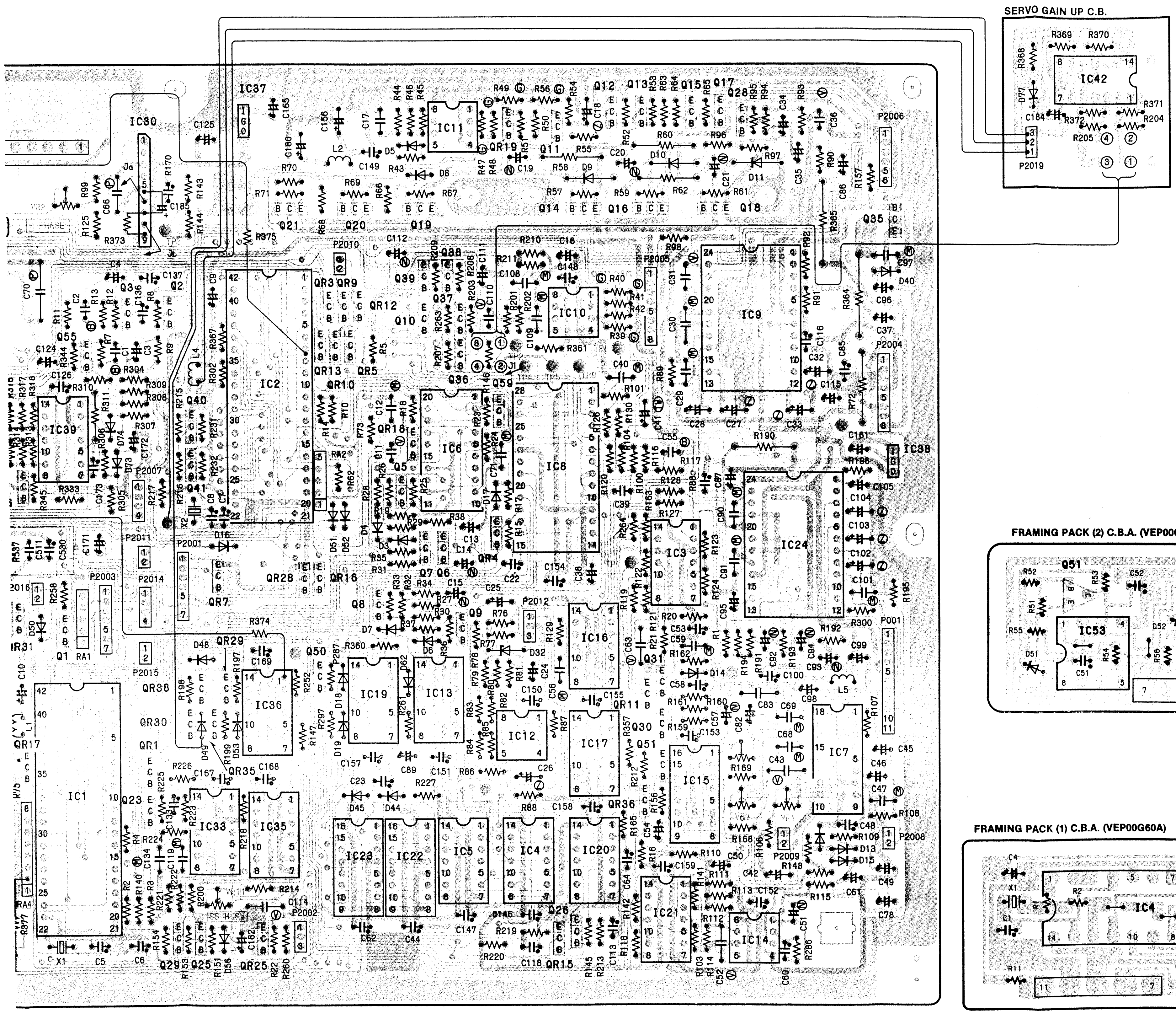
Test Points	
TP2001	C-7
TP2002	D-7
TP2003	E-5
TP2004	D-7
TP2005	D-7
TP2007	B-6
TP2008	D-7
TP2009	D-7
TP2010	C-5
TP2011	C-5
TP2013	D-8
TP2014	B-8
TP2015	E-1
TP2016	E-1
TP2017	E-1

Adjustments	
VR2001	B-8
VR2002	E-4
VR2007	B-8
VR2008	B-8
VR2011	A-5
VR2012	E-1

ADDRESS INFORMATION

SERVO C.B.A. (VEP02261A1)


F
E
D
C
B
A
1
2
3
4
IC41
IC40
IC32
IC28
IC18
IC25
IC29
IC27
IC26
IC34
IC39
IC31
IC509
IC552
IC503
IC504
IC551
IC512
IC508
IC510
IC511
IC501
IC553
IC505
IC502
IC507
IC506
IC1
COLOUR FRAMING SECTION
SERVO SECTION

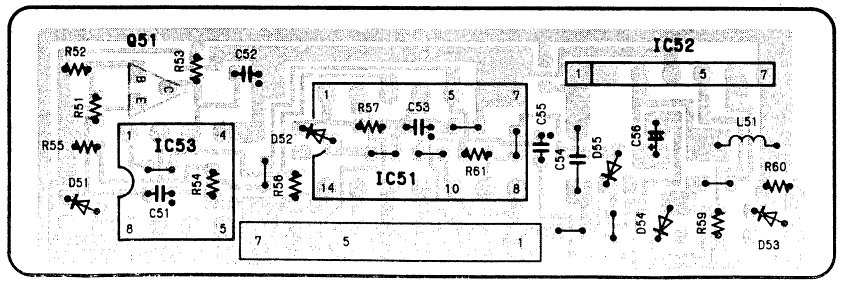

SERVO GAIN UP C.B.
IC42
P2019
IC30
IC37
IC11
IC10
IC9
IC2
IC39
IC6
IC8
IC3
IC24
IC38
IC16
IC19
IC13
IC36
IC12
IC17
IC15
IC7
IC1
IC33
IC35
IC23
IC22
IC5
IC4
IC20
IC21
IC14
P2006
P2004
P2010
P2005
P2007
P2011
P2001
P2003
P2014
P2015
P2012
P2002
P2009
P2008
P001

REF.NO.2000 SERIES

O SECTION

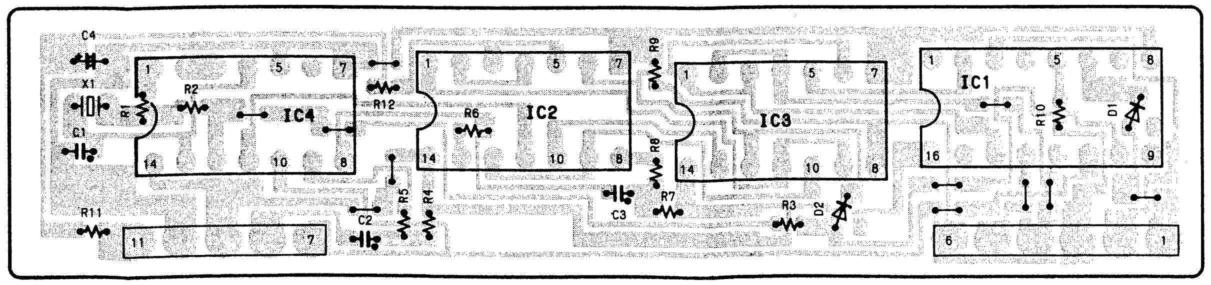
FRAMING PACK (2) C.B.A. (VEP00G61A)

REF.NO.200 SERIES


Q51
IC52
IC53
IC51
L51

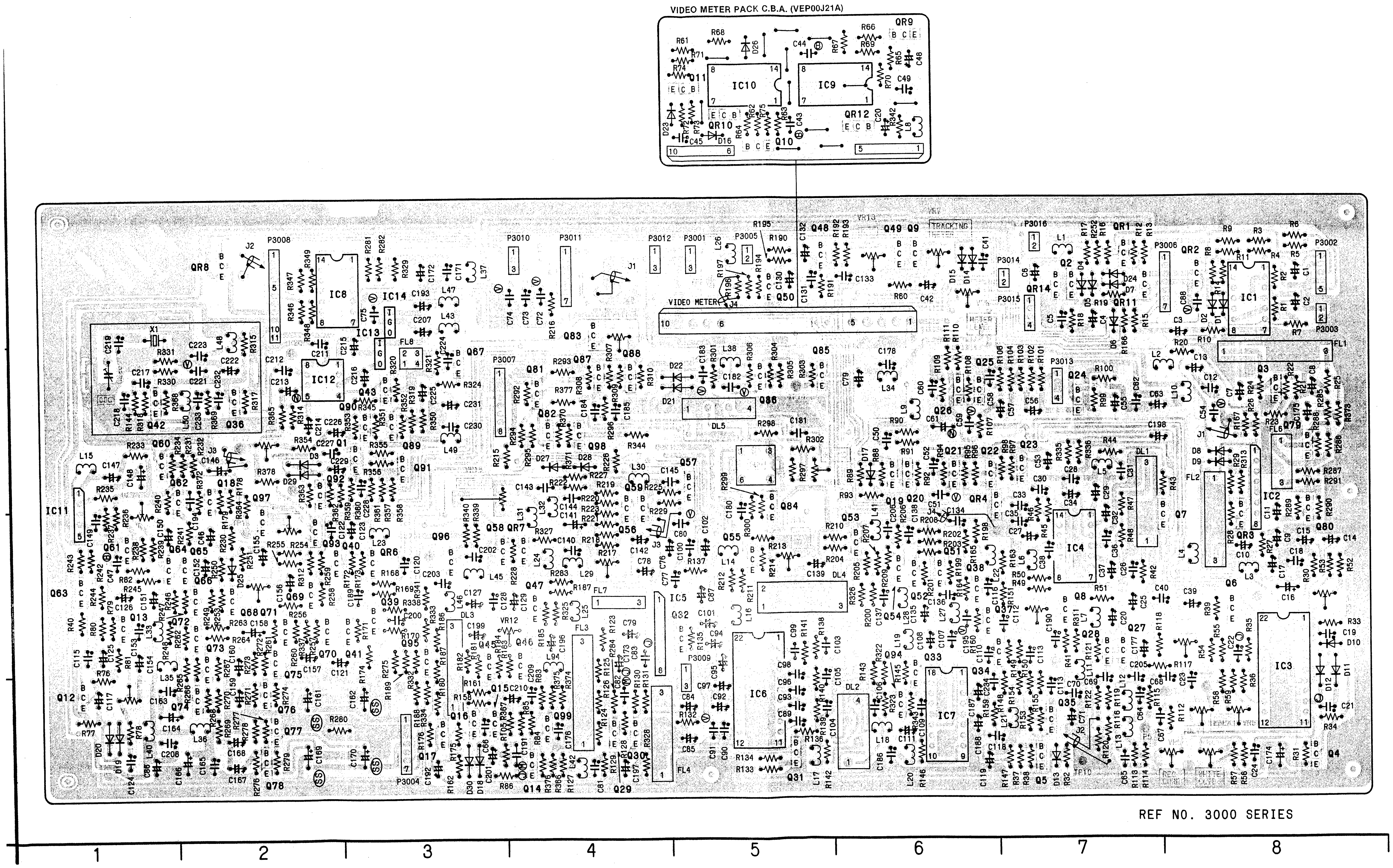
FRAMING PACK (1) C.B.A. (VEP00G60A)

REF.NO.200 SERIES


IC4
IC2
IC3
IC1
X1

4 5 6 7 8 9 10 11 12 13

IDEO C.B.A. (VEP03389A)


VIDEO METER PACK C.B.A. (VEP00J21A)
IC10
IC9
VIDEO METER
TRACKING
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC11
IC12
IC13
IC14
REF NO. 3000 SERIES
1
2
3
4
5
6
7
8

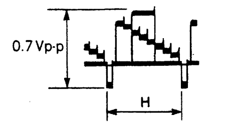
Transistors	
Q3001	C-3
Q3002	D-7
Q3003	C-8
Q3004	A-8
Q3005	A-7
Q3006	B-8
Q3007	B-8
Q3008	B-7
Q3009	D-6
Q3010	E-5
Q3011	E-5
Q3012	A-1
Q3013	B-1
Q3014	A-4
Q3015	A-3
Q3016	A-3
Q3017	A-3
Q3018	C-2
Q3019	C-6
Q3020	C-6
Q3021	C-6
Q3022	C-6
Q3023	C-7
Q3024	C-7
Q3025	C-6
Q3026	C-6
Q3027	B-7
Q3028	B-7
Q3029	A-4
Q3030	A-4
Q3031	A-5
Q3032	B-5
Q3033	B-6
Q3034	B-6
Q3035	A-7
Q3036	C-2
Q3037	B-6
Q3038	B-6
Q3039	B-3
Q3040	B-2
Q3041	B-3
Q3042	C-1
Q3043	C-3
Q3045	B-3
Q3046	B-4
Q3047	B-4
Q3048	D-5
Q3049	D-6
Q3050	D-5
Q3051	B-6
Q3052	B-6
Q3053	B-6
Q3054	B-6
Q3055	B-5
Q3056	B-4
Q3057	C-5
Q3058	B-3
Q3059	C-4

ADDRESS INFORMATION

Video C.B.A.	
ansistors	
Q3001	C-3
Q3002	D-7
Q3003	C-8
Q3004	A-8
Q3005	A-7
Q3006	B-8
Q3007	B-8
Q3008	B-7
Q3009	D-6
Q3010	E-5
Q3011	E-5
Q3012	A-1
Q3013	B-1
Q3014	A-4
Q3015	A-3
Q3016	A-3
Q3017	A-3
Q3018	C-2
Q3019	C-6
Q3020	C-6
Q3021	C-6
Q3022	C-6
Q3023	C-7
Q3024	C-7
Q3025	C-6
Q3026	C-6
Q3027	B-7
Q3028	B-7
Q3029	A-4
Q3030	A-4
Q3031	A-5
Q3032	B-5
Q3033	B-6
Q3034	B-6
Q3035	A-7
Q3036	C-2
Q3037	B-6
Q3038	B-6
Q3039	B-3
Q3040	B-2
Q3041	B-3
Q3042	C-1
Q3043	C-3
Q3045	B-3
Q3046	B-4
Q3047	B-4
Q3048	D-5
Q3049	D-6
Q3050	D-5
Q3051	B-6
Q3052	B-6
Q3053	B-6
Q3054	B-6
Q3055	B-5
Q3056	B-4
Q3057	C-5
Q3058	B-3
Q3059	C-4
Q3060	C-1
Q3061	B-1
Q3062	C-2
Q3063	B-1
Q3064	B-1
Q3065	B-2
Q3066	B-2
Q3067	C-3
Q3068	B-2
Q3069	B-2
Q3070	B-2
Q3071	B-2
Q3072	B-2
Q3073	B-2
Q3074	A-2
Q3075	B-2
Q3076	A-2
Q3077	A-2
Q3078	A-2
Q3079	C-8
Q3080	B-8
Q3081	C-4
Q3082	C-4
Q3083	D-4
Q3084	C-5
Q3085	C-5
Q3086	C-5
Q3087	C-4
Q3088	C-4
Q3089	C-3
Q3090	C-3
Q3091	C-3
Q3092	C-2
Q3093	B-2
Q3094	B-6
Q3095	B-3
Q3096	B-3
Q3097	C-2
Q3098	C-4
Q3099	A-4
Transistors & Resistors	
QR3001	D-7
QR3002	D-8
QR3003	B-8
QR3004	C-6
QR3006	B-3
QR3007	B-4
QR3008	D-2
QR3009	E-6
QR3010	E-5
QR3011	D-7
QR3012	E-6
QR3014	D-7
Integrated Circuits	
IC3001	D-8
IC3002	C-8
IC3003	B-8
IC3004	B-7
IC3005	B-4
IC3006	A-5
IC3007	A-6
IC3008	D-2
IC3009	E-5
IC3010	E-5
IC3011	C-1
IC3012	C-2
IC3013	D-3
IC3014	D-3
Test Points	
TP3001	B-8
TP3002	A-8
TP3003	B-7
TP3004	A-7
TP3005	A-7
TP3006	B-6
TP3007	A-3
TP3008	D-5
TP3009	B-3
TP3010	A-7
TP3011	B-6
TP3012	D-4
TP3013	D-6
TP3014	C-5
TP3015	B-5
TP3017	C-2
TP3018	C-2
TP3019	B-2
TP3020	C-2
Adjustments	
VR3001	B-9
VR3002	B-8
VR3003	A-8
VR3004	A-8
VR3005	A-8
VR3006	B-7
VR3007	D-6
VR3008	D-6
VR3009	A-8
VR3010	B-4
VR3011	D-4
VR3013	D-6
VR3014	B-1
VR3015	B-5
VR3016	C-3
VR3017	B-2
VR3019	C-5
VR3020	A-1
VR3021	C-2
VR3023	B-2
C3220	C-1
L3039	C-5

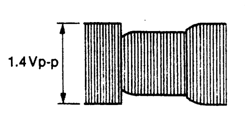
RESS INFORMATION

TP3001



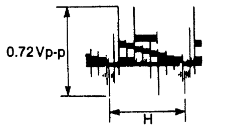
REC/PLAY

TP3008



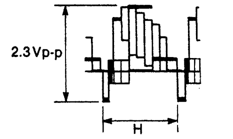
PLAY

TP3002



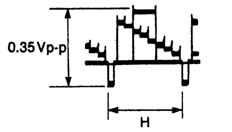
REC/PLAY

TP3009



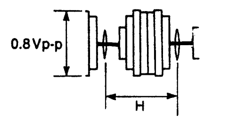
REC/PLAY

TP3003



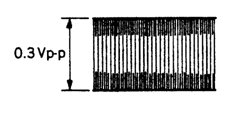
REC/PLAY

TP3015



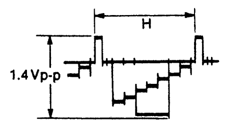
REC/PLAY

TP3004/TP3005



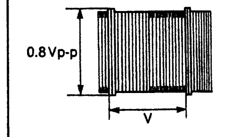
REC

TP3017



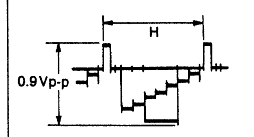
REC/PLAY

TP3006



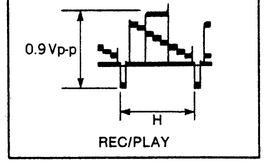
REC

TP3019



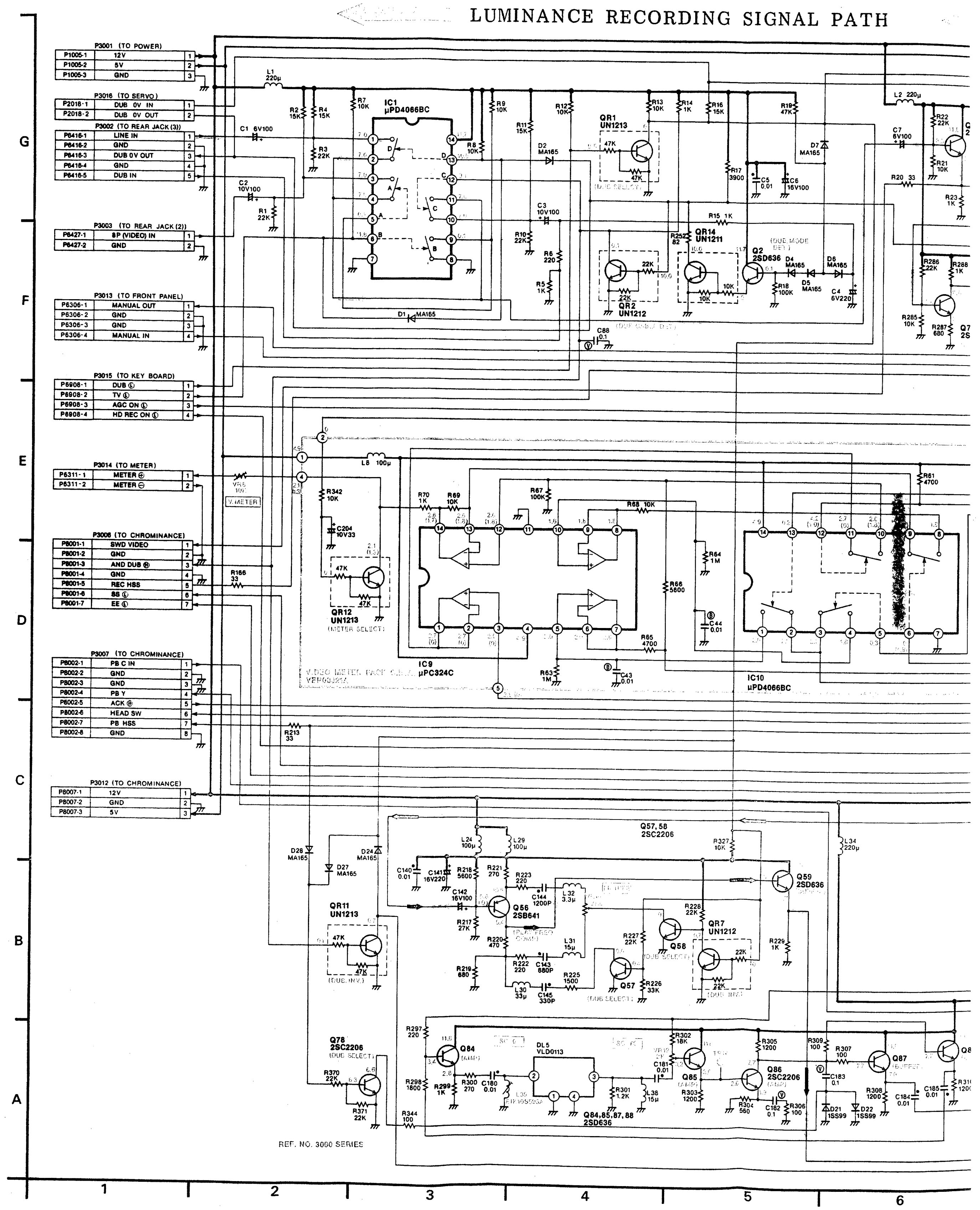
REC/PLAY

TP3007



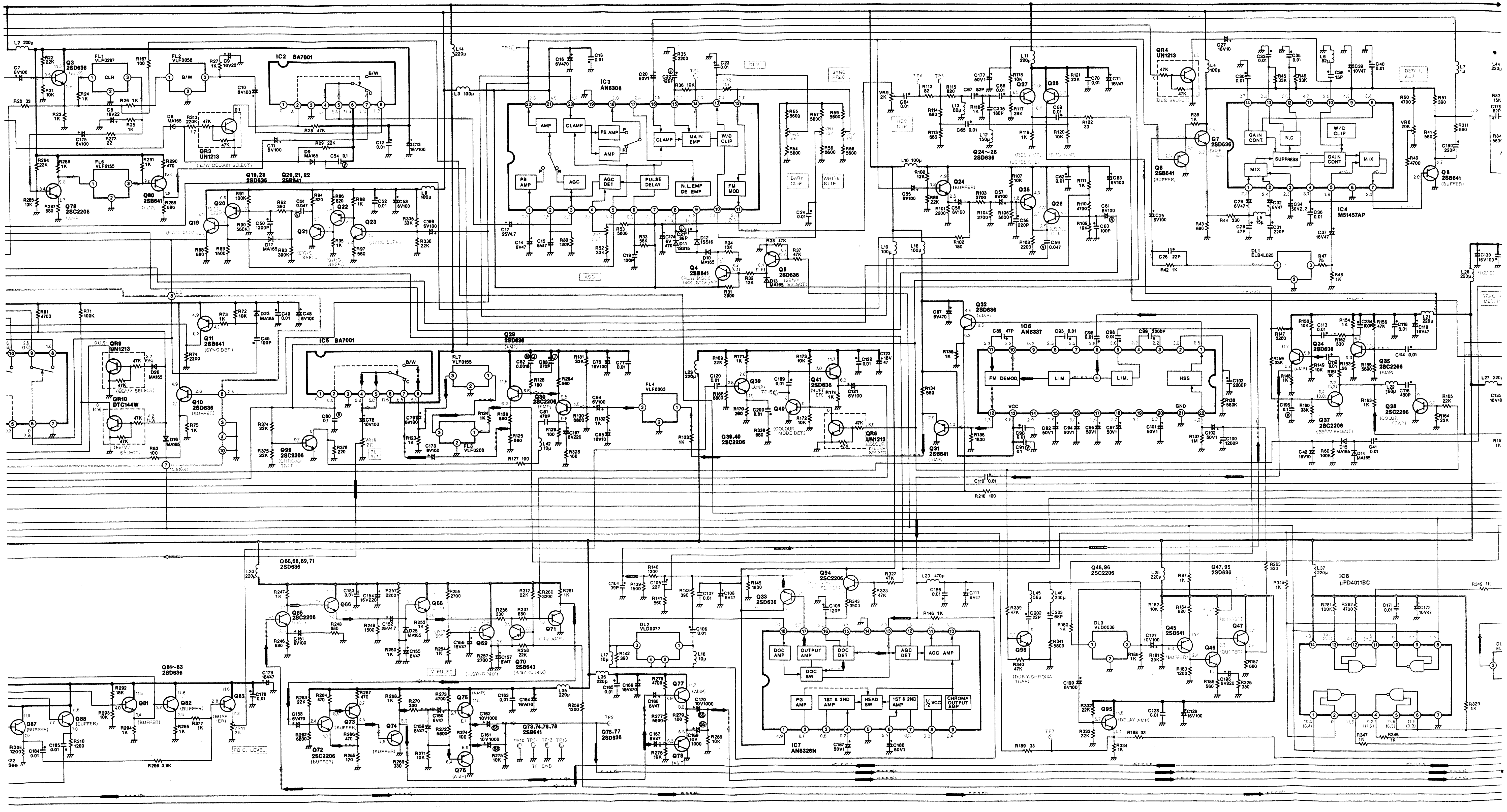
REC/PLAY

VIDEO SCHEMATIC DIAGRAM


LUMINANCE RECORDING SIGNAL PATH
G
F
E
D
C
B
A
1
2
3
4
5
6
P3001 (TO POWER)
P1005-1 12V 1
P1005-2 5V 2
P1005-3 GND 3
P3016 (TO SERVO)
P2018-1 DUB 0V IN 1
P2018-2 DUB 0V OUT 2
P3002 (TO REAR JACK (3))
P6416-1 LINE IN 1
P6416-2 GND 2
P6416-3 DUB 0V OUT 3
P6416-4 GND 4
P6416-5 DUB IN 5
P3003 (TO REAR JACK (2))
P6427-1 8P (VIDEO) IN 1
P6427-2 GND 2
P3013 (TO FRONT PANEL)
P6306-1 MANUAL OUT 1
P6306-2 GND 2
P6306-3 GND 3
P6306-4 MANUAL IN 4
P3015 (TO KEY BOARD)
P6908-1 DUB Ⓛ 1
P6908-2 TV Ⓛ 2
P6908-3 AGC ON Ⓛ 3
P6908-4 HD REC ON Ⓛ 4
P3014 (TO METER)
P6311-1 METER ⊕ 1
P6311-2 METER ⊖ 2
P3006 (TO CHROMINANCE)
P8001-1 SWD VIDEO 1
P8001-2 GND 2
P8001-3 AND DUB Ⓗ 3
P8001-4 GND 4
P8001-5 REC HSS 5
P8001-6 SS Ⓛ 6
P8001-7 EE Ⓛ 7
P3007 (TO CHROMINANCE)
P8002-1 PB C IN 1
P8002-2 GND 2
P8002-3 GND 3
P8002-4 PB Y 4
P8002-5 ACK Ⓗ 5
P8002-6 HEAD SW 6
P8002-7 PB HSS 7
P8002-8 GND 8
P3012 (TO CHROMINANCE)
P8007-1 12V 1
P8007-2 GND 2
P8007-3 5V 3
V.METER
R166 33
C1 6V100
C2 10V100
L1 220µ
IC1 µPD4066BC
QR1 UN1213
QR2 UN1212
QR14 UN1211
Q2 2SD636
D1 MA165
D2 MA165
D7 MA165
L2 220µ
C7 6V100
L8 100µ
QR12 UN1213
IC9 µPC324C
IC10 µPD4066BC
R213 33
Q57, 58 2SC2206
Q56 2SB641
Q59 2SD636
QR7 UN1212
QR11 UN1213
D24 MA165
D26 MA165
D27 MA165
L24 100µ
L29 100µ
L34 220µ
Q78 2SC2206
DL5 VLD0113
Q84,85,87,88 2SD636
Q86 2SC2206
D21 1SS99
D22 1SS99
REF. NO. 3000 SERIES

LUMINANCE E-E SIGNAL PATH LUMINANCE PLAYBACK SIGNAL PATH

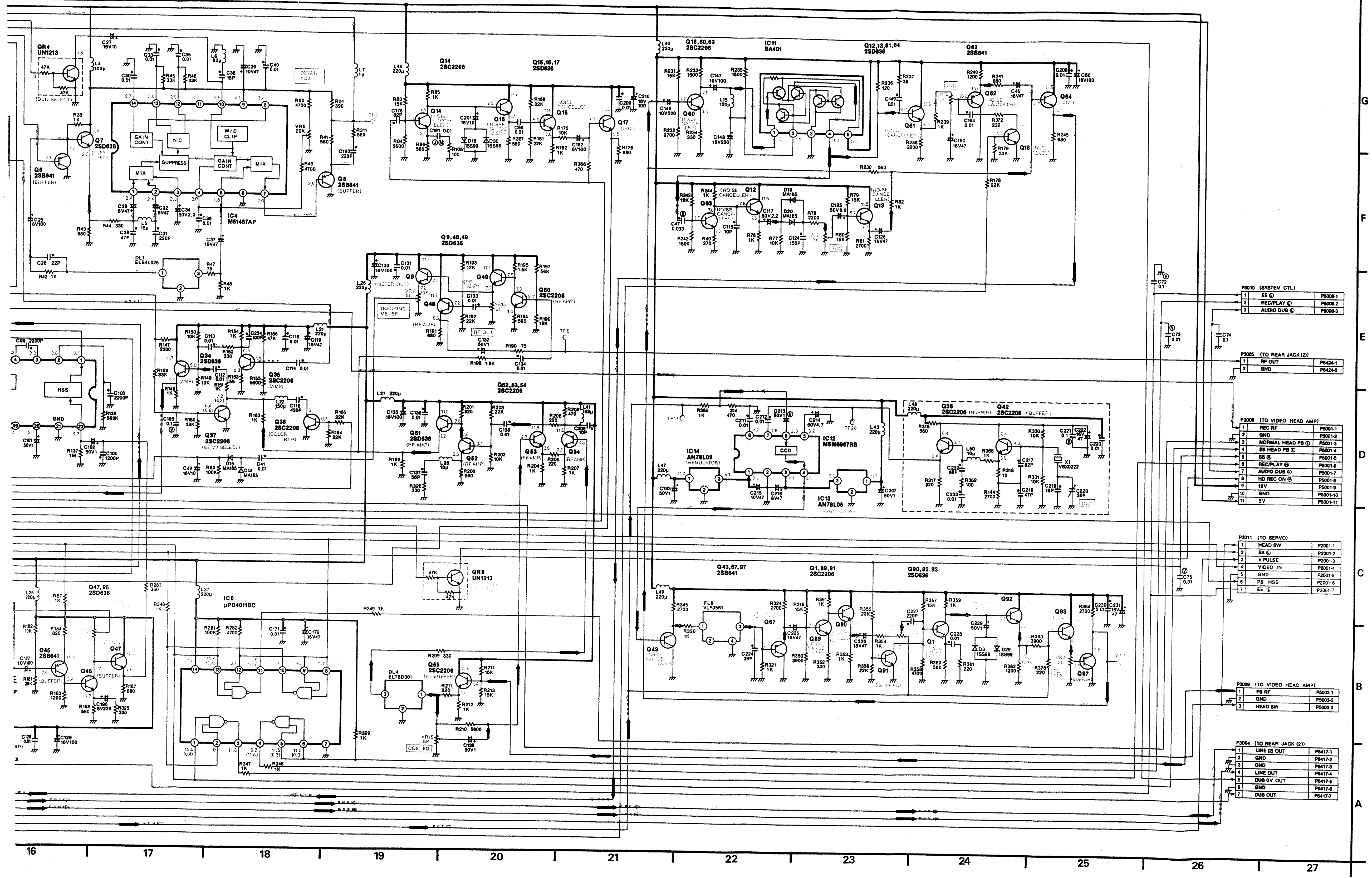
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.



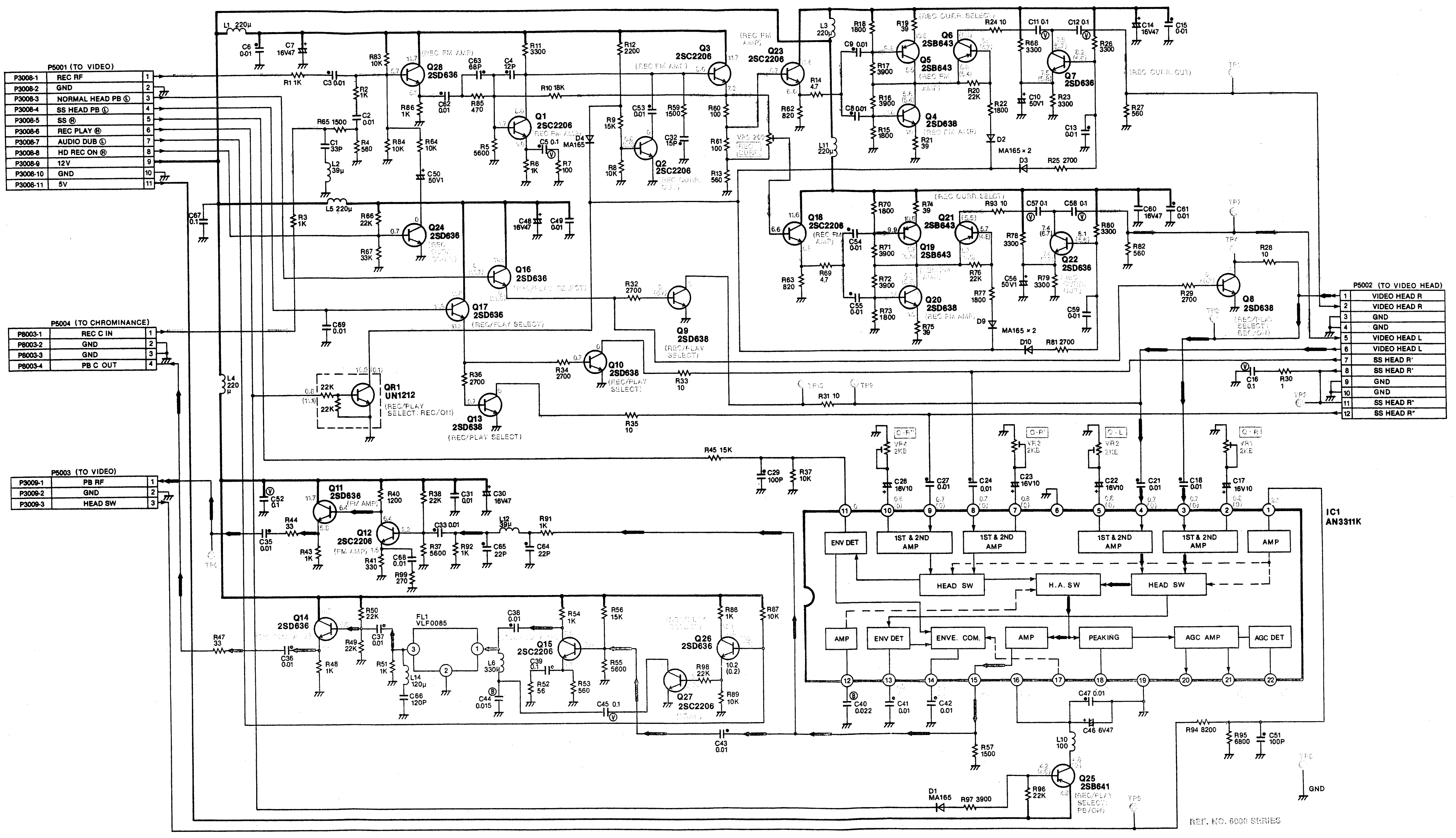
IC2 BA7001
B/W
CLR
FL1 VLF0287
FL2 VLF0056
FL6 VLF0155
QR3 UN1213
(E/W COLOUR SELECT)
Q19,23 2SD636
Q20,21,22 2SB641
Q3 2SD636
Q79 2SC2206
Q80 2SB641
IC3 AN6306
AMP
CLAMP
PB AMP
PB AMP
AGC
AGC DET
PULSE DELAY
N.L.EMP DE EMP
MAIN EMP
W/D CLIP
FM MOD
DARK CLIP
WHITE CLIP
Q4 2SB641
Q5 2SD636
Q24 (BUFFER)
Q24~28 2SD636
Q25
Q26
Q27
Q28
QR4 UN1213
Q6 2SB641 (BUFFER)
Q7 2SD636
Q8 2SB641 (BUFFER)
IC4 M51457AP
GAIN CONT.
N.C
W/D CLIP
SUPPRESS
GAIN CONT
MIX
MIX
DL1 ELB4L025
DETAIL ADJ
IC5 BA7001
QR9 UN1213
QR10 DTC144W
Q10 2SD636 (BUFFER)
Q11 2SB641 (SYNC DET.)
Q29 2SD636 (AMP)
Q30 2SC2206 (AMP)
FL7 VLF0155
FL3 VLF0208
FL4 VLF0063
Q99 2SC2206
Q39,40 2SC2206
Q41 2SD636
QR6 UN1213
Q31 2SB641
Q32 2SD636 (AMP)
IC6 AN6337
FM DEMOD.
LIM.
LIM.
HSS
VCC
GND
Q34 2SD636
Q35 2SC2206
Q37 2SC2206
Q38 2SC2206
Q66,68,69,71 2SD636
Q65 2SC2206
Q70 2SB643
V. PULSE
Q81~83 2SD636
Q87 (BUFFER)
Q88 (BUFFER)
Q81 (BUFFER)
Q82 (BUFFER)
Q83
FB C. LEVEL
Q72 2SC2206 (BUFFER)
Q73 (BUFFER)
Q74 (BUFFER)
Q75 (AMP)
Q76 (AMP)
Q73,74,76,78 2SB641
Q75,77 2SD636
Q77 (AMP)
Q78 (AMP)
TF GND
DL2 VLD0077
Q94 2SC2206
Q33 2SD636
IC7 AN6326N
DOC AMP
OUTPUT AMP
DOC DET
AGC DET
AGC AMP
DOC SW
PB AMP
1ST & 2ND AMP
HEAD SW
1ST & 2ND AMP
1/2 VCC
CHROMA OUTPUT AMP
Q46,96 2SC2206
Q47,95 2SD636
Q96
DL3 VLD0038
Q45 2SB641
Q46 (BUFFER)
Q47
Q95 (DELAY AMP)
IC8 µPD4011BC
6
7
8
9
10
11
12
13
14
15
16
17
18
19

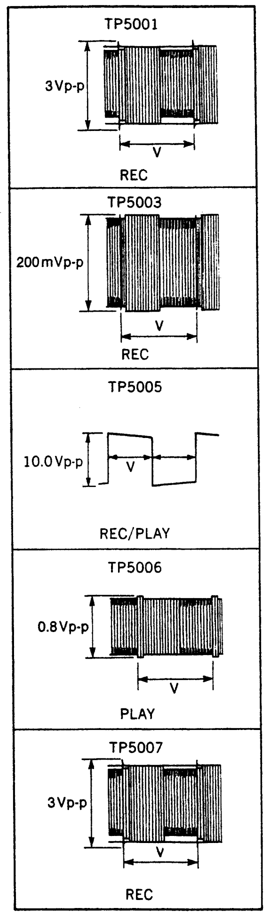
USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN
PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE WITH PAL COLOUR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL.


QR4 UN1213
(DUB SELECT)
Q7 2SD636
Q6 2SB641 (BUFFER)
Q8 2SB641 (BUFFER)
IC4 M51457AP
GAIN CONT.
N.C
W/D CLIP
SUPPRESS
MIX
DETAIL ADJ
DL1 ELB4L025
Q14 2SC2206
Q15,16,17 2SD636
(NOISE CANCELLER)
Q17
Q9,48,49 2SD636
(METER OUT)
TRACKING METER
(RF AMP)
RF OUT
Q50 2SC2206 (RF AMP)
Q34 2SD636 (AMP)
Q35 2SC2206 (AMP)
Q37 2SC2206 (EE/V SELECT)
Q38 2SC2206 (COLOR TRAP)
HSS
Q52,53,54 2SC2206
Q51 2SD636 (RF AMP)
Q52 (RF AMP)
Q53 (RF AMP)
Q54 (RF AMP)
QR8 UN1213
Q47,95 2SD636
Q45 2SB641
Q46 (BUFFER)
Q47 (BUFFER)
IC8 μPD4011BC
DL4 ELT6D301
Q55 2SC2206 (RF BUFFER)
COS EQ
Q18,60,63 2SC2206
IC11 BA401
Q12,13,61,64 2SD636
Q62 2SB641
Q60 (NOISE CANCELLER)
Q61 (NOISE CANCELLER)
Q62 (NOISE CANCELLER)
N.C.
Q64
Q18 (DOC SELECT)
Q63
Q12 (NOISE CANCELLER)
Q13 (NOISE CANCELLER)
IC14 AN78L09 (REGULATOR)
IC12 MSM6957RS
CCD
IC13 AN78L05 (REGULATOR)
Q36 2SC2206 (BUFFER)
Q42 2SC2206 (BUFFER)
X1 VSX0222
Q43,67,97 2SB641
Q1,89,91 2SC2206
Q90,92,93 2SD636
Q43 (NOISE CANCELLER)
FL8 VLF0561
Q67
Q89
Q90
Q91 (SS SELECT)
Q1
Q92
Q93
Q97 (BUFFER)
P3010 (SYSTEM CTL)
1 EE Ⓛ P6008-1
2 REC/PLAY Ⓛ P6008-2
3 AUDIO DUB Ⓛ P6008-3
P3005 (TO REAR JACK (2))
1 RF OUT P6424-1
2 GND P6424-2
P3008 (TO VIDEO HEAD AMP)
1 REC RF P5001-1
2 GND P5001-2
3 NORMAL HEAD PB Ⓛ P5001-3
4 SS HEAD PB Ⓛ P5001-4
5 SS Ⓗ P5001-5
6 REC/PLAY Ⓗ P5001-6
7 AUDIO DUB Ⓛ P5001-7
8 HD REC ON Ⓗ P5001-8
9 12V P5001-9
10 GND P5001-10
11 5V P5001-11
P3011 (TO SERVO)
1 HEAD SW P2001-1
2 SS Ⓛ P2001-2
3 V PULSE P2001-3
4 VIDEO IN P2001-4
5 GND P2001-5
6 PB HSS P2001-6
7 EE Ⓛ P2001-7
P3009 (TO VIDEO HEAD AMP)
1 PB RF P5003-1
2 GND P5003-2
3 HEAD SW P5003-3
P3004 (TO REAR JACK (2))
1 LINE (2) OUT P6417-1
2 GND P6417-2
3 GND P6417-3
4 LINE OUT P6417-4
5 DUB 0V OUT P6417-5
6 GND P6417-6
7 DUB OUT P6417-7
G
F
E
D
C
B
A
16
17
18
19
20
21
22
23
24
25
26
27

DEO HEAD AMP SCHEMATIC DIAGRAM


P5001 (TO VIDEO)
P3008-1 REC RF
P3008-2 GND
P3008-3 NORMAL HEAD PB Ⓛ
P3008-4 SS HEAD PB Ⓛ
P3008-5 SS Ⓡ
P3008-6 REC PLAY Ⓡ
P3008-7 AUDIO DUB Ⓛ
P3008-8 HD REC ON Ⓡ
P3008-9 12V
P3008-10 GND
P3008-11 5V
P5004 (TO CHROMINANCE)
P8003-1 REC C IN
P8003-2 GND
P8003-3 GND
P8003-4 PB C OUT
P5003 (TO VIDEO)
P3009-1 PB RF
P3009-2 GND
P3009-3 HEAD SW
P5002 (TO VIDEO HEAD)
1 VIDEO HEAD R
2 VIDEO HEAD R
3 GND
4 GND
5 VIDEO HEAD L
6 VIDEO HEAD L
7 SS HEAD R'
8 SS HEAD R'
9 GND
10 GND
11 SS HEAD R"
12 SS HEAD R"
Q28 2SD636 (REC FM AMP)
Q1 2SC2206 (REC FM AMP)
Q2 2SC2206 (REC CURR. SELECT)
Q3 2SC2206 (REC FM AMP)
Q23 2SC2206 (REC FM AMP)
Q4 2SD638 (REC FM AMP)
Q5 2SB643 (REC FM AMP)
Q6 2SB643
Q7 2SD636 (REC CURR. OUT)
Q24 2SD636
Q16 2SD636 (REC/PLAY SELECT)
Q17 2SD636 (REC/PLAY SELECT)
Q9 2SD638 (REC/PLAY SELECT)
Q10 2SD638 (REC/PLAY SELECT)
Q13 2SD638 (REC/PLAY SELECT)
QR1 UN1212 (REC/PLAY SELECT: REC/ON)
Q18 2SC2206 (REC FM AMP)
Q19 2SB643
Q20 2SD638 (REC FM AMP)
Q21 2SB643
Q22 2SD636
Q8 2SD638 (REC/PLAY SELECT: REC/ON)
Q11 2SD636 (FM AMP)
Q12 2SC2206 (FM AMP)
Q14 2SD636
Q15 2SC2206
Q26 2SD636
Q27 2SC2206
Q25 2SB641 (REC/PLAY SELECT: PB/ON)
FL1 VLF0085
D1 MA165
D2 MA165 × 2
D4 MA165
D9 MA165 × 2
IC1 AN3311K
ENV DET
1ST & 2ND AMP
AMP
HEAD SW
H.A. SW
ENV DET
ENVE. COM.
PEAKING
AGC AMP
AGC DET
VR4 2KB
VR3 2KB
VR2 2KB
VR1 2KB
C-R
C-L
G-R
G-L
GND
REF. NO. 6000 SERIES



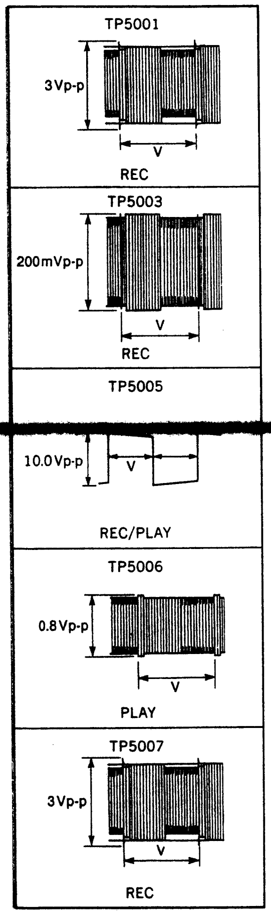
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

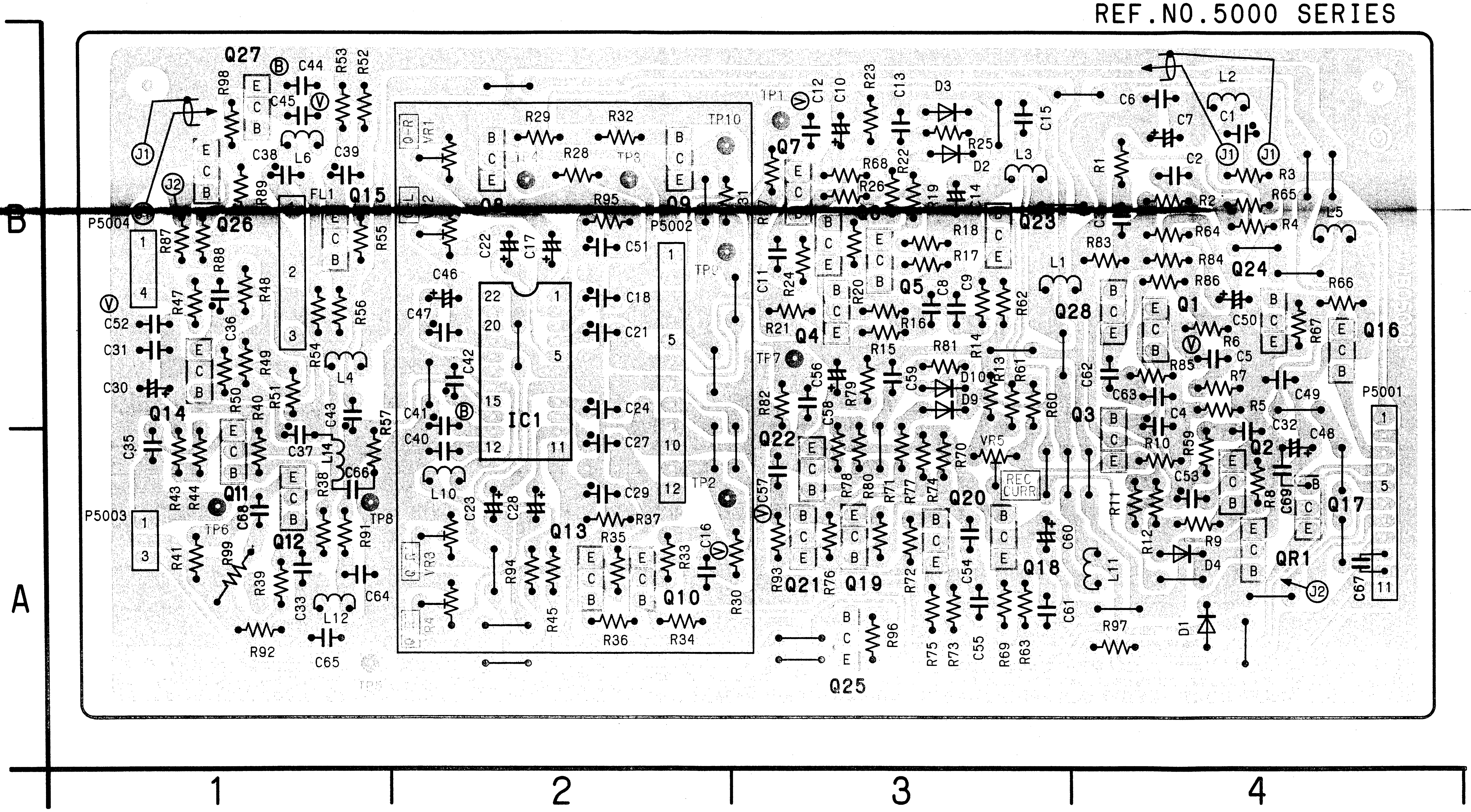
NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE WITH PAL COLOUR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL.

⇦ MAIN SIGNAL PATH IN RECORD MODE ⬅ MAIN SIGNAL PATH IN PLAYBACK MODE

1	2	3	4	5	6	7	8	9

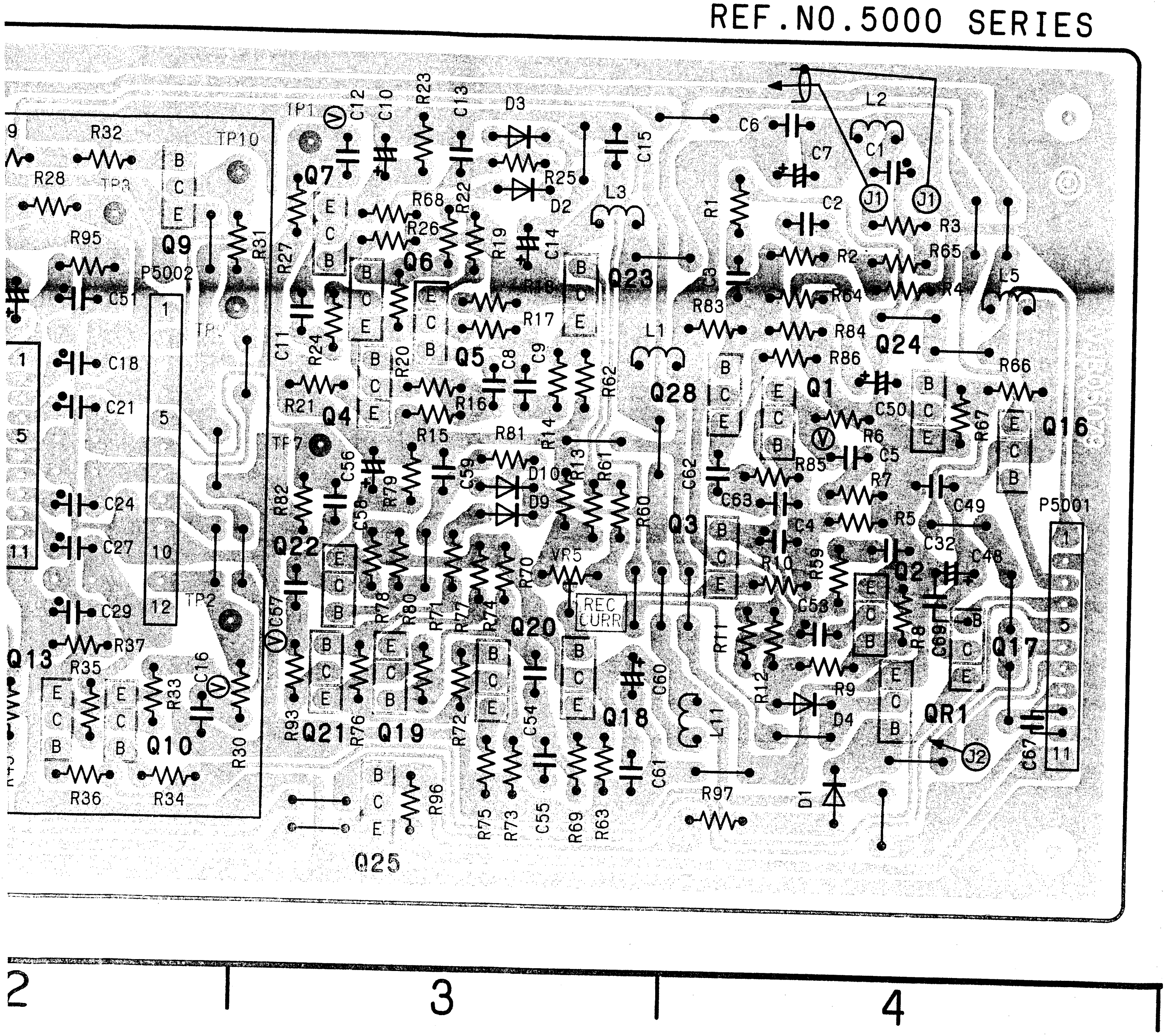
VIDEO HEAD AMP C.B.A. (VEP05079B)

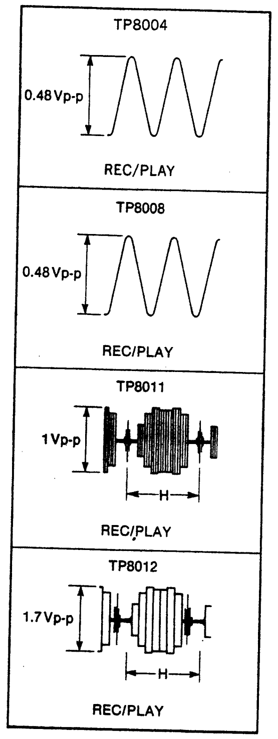



REF.NO.5000 SERIES
B
A
1
2
3
4
P5004
P5003
P5002
P5001
IC1
VR1
VR3
VR5
REC CURR
TP1
TP2
TP6
TP7
TP8
TP10
Q1
Q2
Q3
Q4
Q5
Q7
Q10
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
Q25
Q26
Q27
Q28
QR1
FL1
J1
J2

Video Head Amp C.	
Transistor	
Q5001	B-
Q5002	A-
Q5003	A-
Q5004	B-
Q5005	B-
Q5006	B-
Q5007	B-
Q5008	B-
Q5009	B-
Q5010	A-
Q5011	A-
Q5012	A-
Q5013	A-
Q5014	B-
Q5015	B-
Q5016	B-
Q5017	A-
Q5018	A-
Q5019	A-
Q5020	A-
Q5021	A-
Q5022	A-
Q5023	B-
Q5024	B-
Q5025	A-
Q5026	B-
Q5027	B-
Q5028	B-
Transistor & Resisto	
QR5001	A-
Integrated Circuit	
IC5001	B-
Test Point	
TP5001	B-
TP5002	A-
TP5003	B-
TP5004	B-
TP5005	A-
TP5006	A-
TP5007	B-
TP5008	A-
TP5009	B-
TP5010	B-
Adjustment	
VR5001	B-
VR5002	B-
VR5003	A-
VR5004	A-
VR5005	

ADDRESS INFORMATI


REF.NO.5000 SERIES
R32
TP10
R28
R95
Q9
P5002
R31
TP1
C12
C10
R23
C13
D3
Q7
R68
R22
R26
R25
D2
Q6
R19
C14
L3
Q23
C15
C6
C7
L2
C1
J1
C2
R1
R3
R2
R65
R64
R4
L5
C51
R27
R18
R17
R83
R84
Q24
C18
C11
R24
R20
Q5
C8
C9
L1
R86
R66
C21
R21
Q4
R16
R62
Q28
Q1
C50
R67
Q16
TP7
R15
R81
R14
R13
R61
R85
R6
C5
C56
R82
R79
C59
D10
D9
C62
C63
R7
C49
P5001
C24
C27
Q22
R78
R80
R71
R77
R74
R70
VR5
REC CURR
R60
Q3
C4
R10
R59
R5
C32
Q2
C48
C29
R37
TP2
C57
Q20
R11
C53
R8
C69
Q17
Q13
R35
C16
R33
Q10
R30
R93
Q21
R76
Q19
R72
C54
Q18
C60
L11
R12
R9
D4
QR1
J2
C67
R36
R34
R96
R75
R73
C55
R69
R63
C61
R97
D1
Q25
2
3
4



Video Head Amp C.B.A.

Transistor

Q5001	B-4
Q5002	A-4
Q5003	A-4
Q5004	B-3
Q5005	B-3
Q5006	B-3
Q5007	B-3
Q5008	B-2
Q5009	B-2
Q5010	A-2
Q5011	A-1
Q5012	A-1
Q5013	A-2
Q5014	B-1
Q5015	B-1
Q5016	B-4
Q5017	A-4
Q5018	A-3
Q5019	A-3
Q5020	A-3
Q5021	A-3
Q5022	A-3
Q5023	B-3
Q5024	B-4
Q5025	A-3
Q5026	B-1
Q5027	B-1
Q5028	B-4

Transistor & Resistor

QR5001	A-4

Integrated Circuit

IC5001	B-2

Test Point

TP5001	B-3
TP5002	A-2
TP5003	B-2
TP5004	B-2
TP5005	A-1
TP5006	A-1
TP5007	B-3
TP5008	A-1
TP5009	B-2
TP5010	B-2

Adjustment

VR5001	B-2
VR5002	B-2
VR5003	A-2
VR5004	A-2
VR5005	

ADDRESS INFORMATION

Chrominance C.B.A.

Transistors

Q8001	B-1
Q8002	A-2
Q8003	B-3
Q8004	B-3
Q8005	B-3
Q8006	B-3
Q8007	A-4
Q8008	B-6
Q8009	B-5
Q8010	B-6
Q8011	A-6
Q8012	A-6
Q8013	C-6
Q8014	C-7
Q8015	C-6
Q8016	C-5
Q8017	C-4
Q8018	C-4
Q8019	C-4
Q8020	C-5
Q8021	C-6
Q8022	C-6
Q8023	C-5
Q8024	B-6
Q8025	A-6
Q8026	C-2
Q8027	C-4
Q8028	C-3
Q8029	C-2
Q8030	C-2
Q8031	C-1
Q8032	C-1
Q8033	A-1
Q8034	B-1
Q8035	C-2
Q8036	C-2
Q8037	C-3
Q8038	A-7
Q8039	B-7
Q8040	B-7
Q8041	B-5

Transistors & Resistors

QR8001	B-2
QR8002	B-4
QR8003	B-5
QR8004	B-5
QR8005	C-2
QR8006	A-1
QR8007	B-1
QR8008	A-1
QR8009	A-1
QR8011	C-1
QR8012	B-1

Integrated Circuits

IC8001	A-2
IC8002	A-3
IC8003	A-5
IC8004	B-6
IC8005	B-3
IC8006	C-5
IC8007	C-6
IC8008	B-7
IC8009	A-3

Test Points

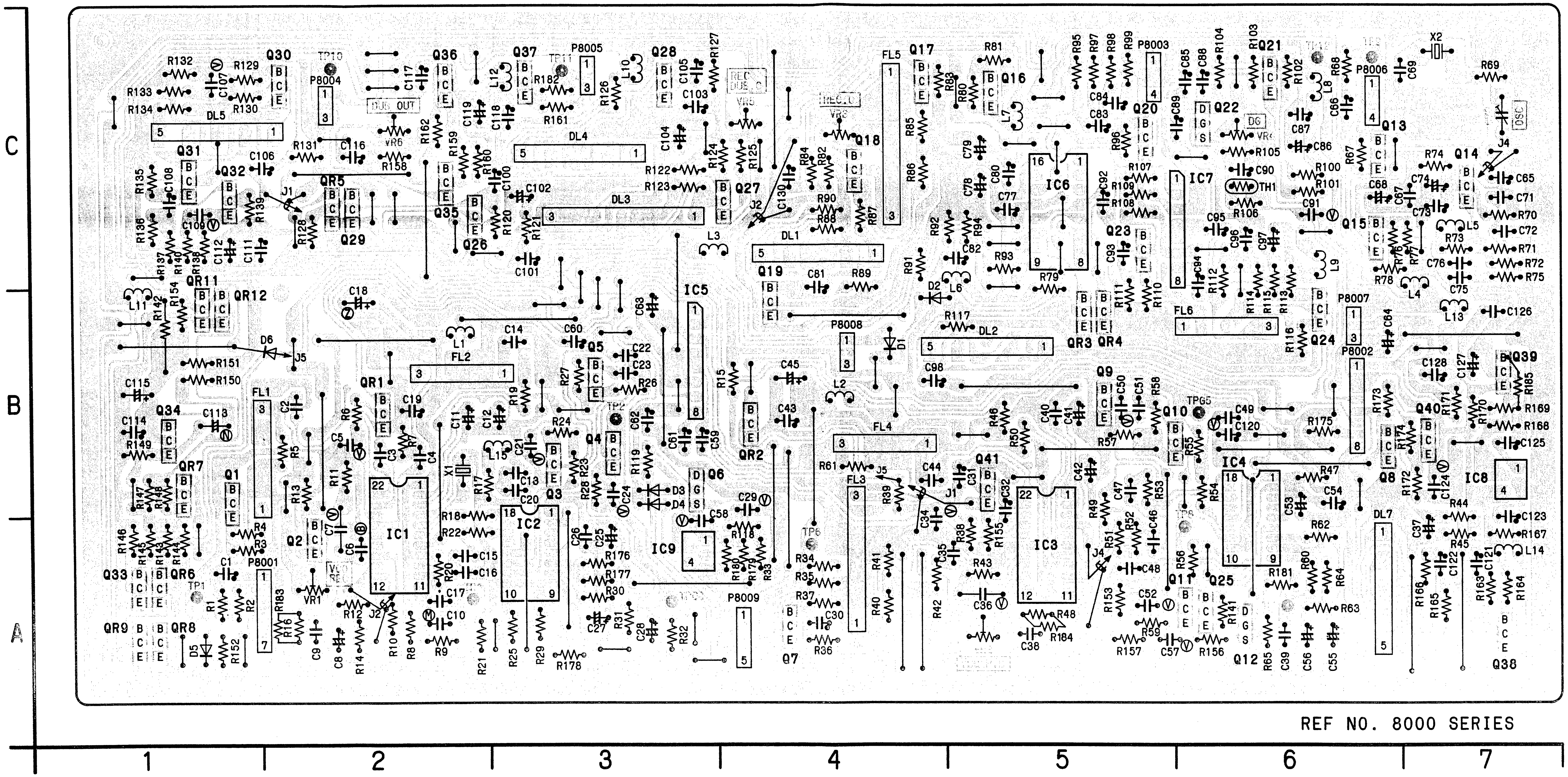
TP8001	A-1
TP8002	B-3
TPG8003	A-3
TP8004	A-2
TPG8005	B-6
TP8006	A-4
TP8007	A-6
TP8008	A-6
TP8009	C-6
TP8010	C-2
TP8011	C-3
TP8012	C-6

Adjustments

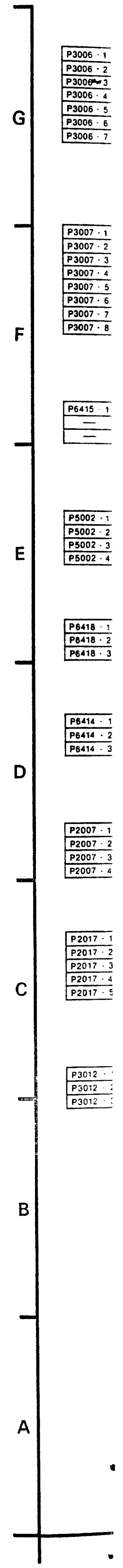
VR8001	A-2
VR8002	A-5
VR8003	C-4
VR8004	C-6
VR8005	C-4
VR8006	C-2

ADDRESS INFORMATION

HROMINANCE C.B.A. (VEP08114A1)


C
B
A
1
2
3
4
5
6
7
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
DL1
DL2
DL3
DL4
DL5
DL7
FL1
FL2
FL3
FL4
FL5
FL6
P8001
P8002
P8003
P8004
P8005
P8006
P8007
P8008
P8009
X1
X2
TP1
TP2
TP6
TP10
TP11
TPG5
VR1
VR5
VR6
DUB OUT
REC.C
OSC
DG
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
Q25
Q26
Q27
Q28
Q29
Q30
Q31
Q32
Q33
Q34
Q35
Q36
Q37
Q38
Q39
Q40
Q41
QR1
QR2
QR3
QR4
QR5
QR6
QR7
QR8
QR9
QR11
QR12
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
L14
L15
D1
D2
D3
D4
D5
D6
J1
J2
J3
J4
J5
TH1

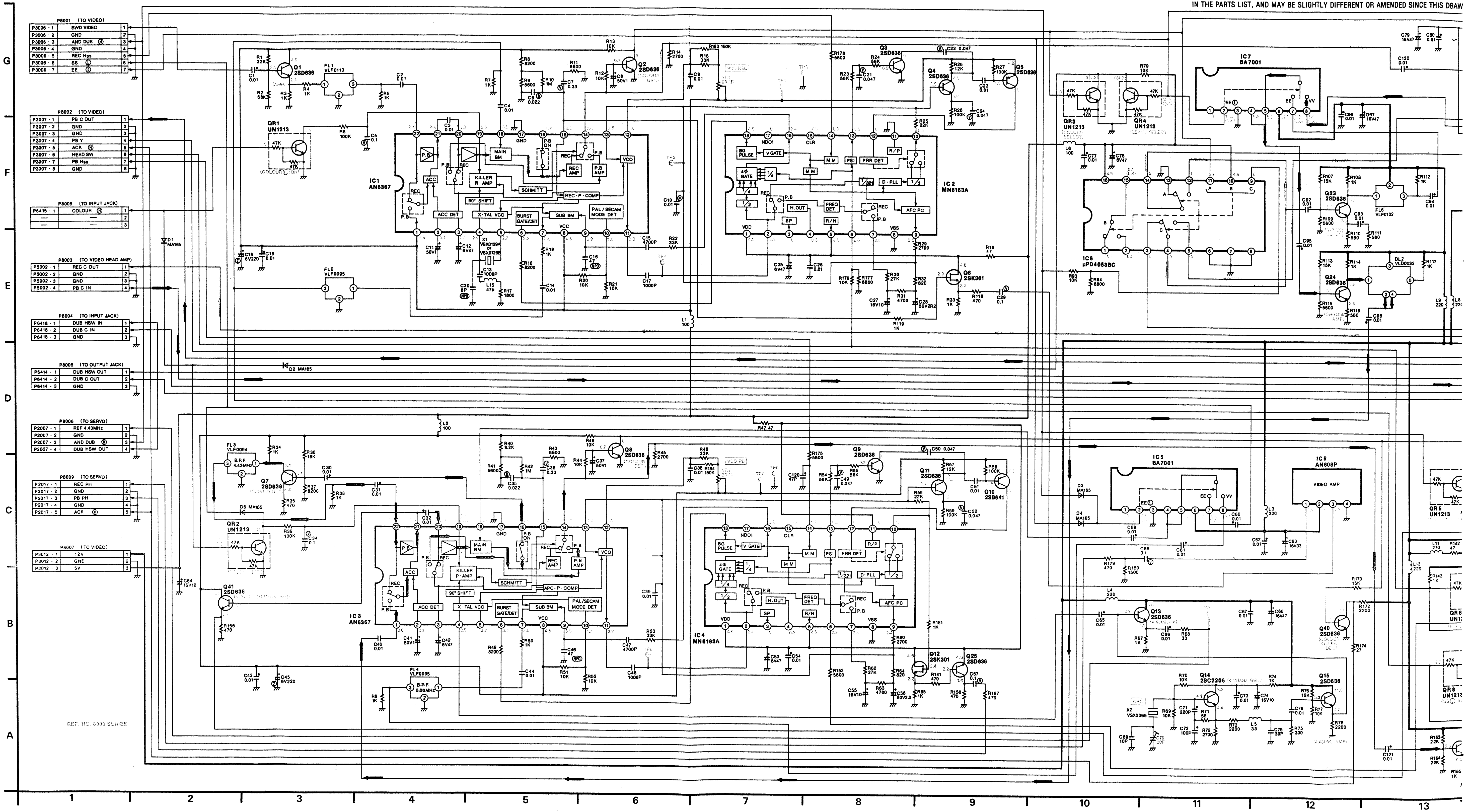
REF NO. 8000 SERIES



CHROMINANCE SCHEMATIC DIAGRAM

CHROMINANCE RECORDING SIGNAL PATH ⟵ CHROMINANCE PLAYBACK SIGNAL PATH

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORREC
IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAW

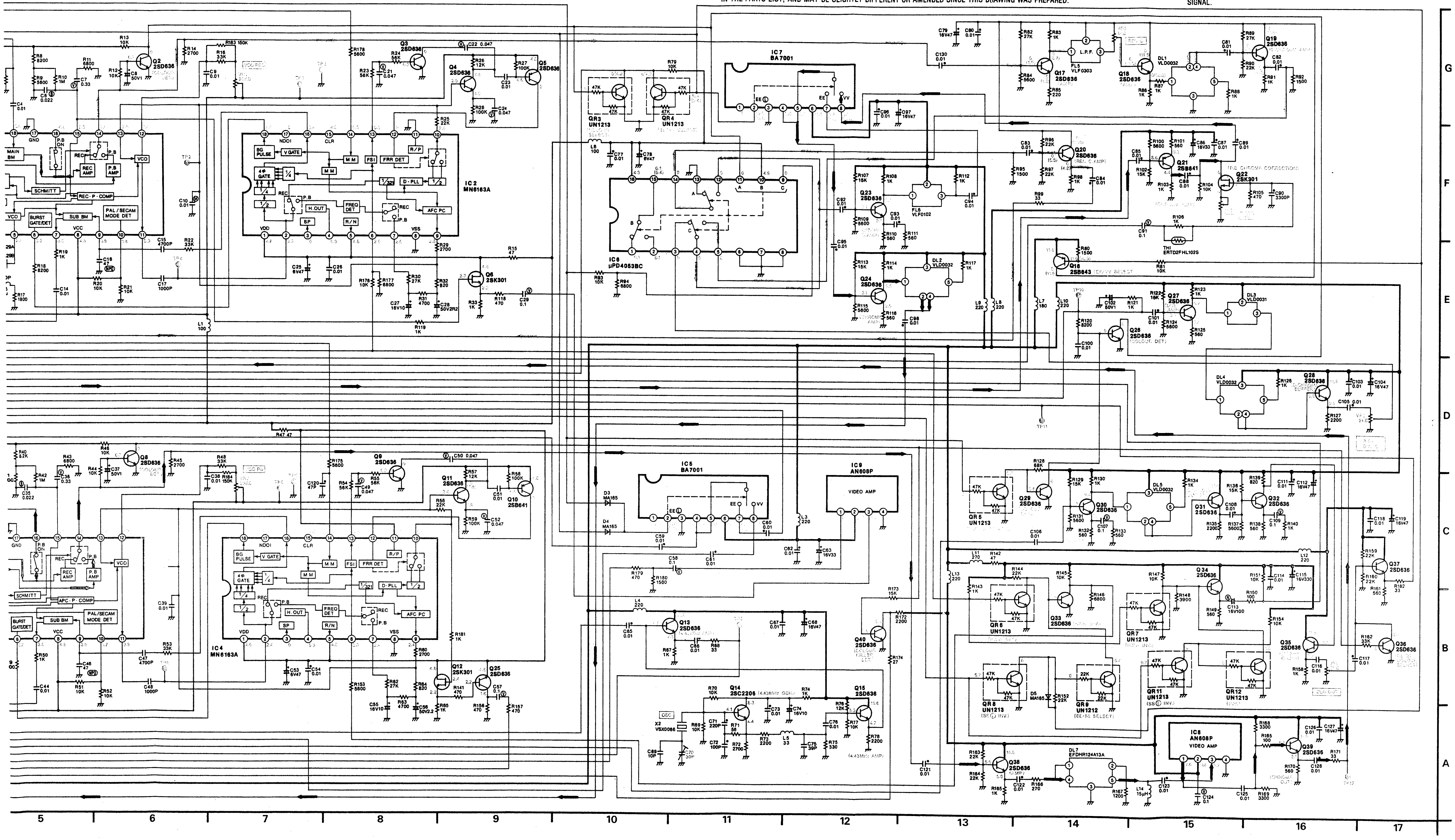


P8001 (TO VIDEO)
P3006 · 1 SWD VIDEO 1
P3006 · 2 GND 2
P3006 · 3 AND DUB Ⓗ 3
P3006 · 4 GND 4
P3006 · 5 REC Hss 5
P3006 · 6 SS Ⓛ 6
P3006 · 7 EE Ⓛ 7
P8002 (TO VIDEO)
P3007 · 1 PB C OUT 1
P3007 · 2 GND 2
P3007 · 3 GND 3
P3007 · 4 PB Y 4
P3007 · 5 ACK Ⓗ 5
P3007 · 6 HEAD SW 6
P3007 · 7 PB Hss 7
P3007 · 8 GND 8
P8008 (TO INPUT JACK)
P6415 · 1 COLOUR Ⓗ 1
— — 2
— — 3
P8003 (TO VIDEO HEAD AMP)
P5002 · 1 REC C OUT 1
P5002 · 2 GND 2
P5002 · 3 GND 3
P5002 · 4 PB C IN 4
P8004 (TO INPUT JACK)
P6418 · 1 DUB HSW IN 1
P6418 · 2 DUB C IN 2
P6418 · 3 GND 3
P8005 (TO OUTPUT JACK)
P6414 · 1 DUB HSW OUT 1
P6414 · 2 DUB C OUT 2
P6414 · 3 GND 3
P8006 (TO SERVO)
P2007 · 1 REF 4.43MHz 1
P2007 · 2 GND 2
P2007 · 3 AND DUB Ⓗ 3
P2007 · 4 DUB HSW OUT 4
P8009 (TO SERVO)
P2017 · 1 REC PH 1
P2017 · 2 GND 2
P2017 · 3 PB PH 3
P2017 · 4 GND 4
P2017 · 5 ACK Ⓗ 5
P8007 (TO VIDEO)
P3012 · 1 12V 1
P3012 · 2 GND 2
P3012 · 3 5V 3
IC1 AN6367
IC2 MN6163A
IC3 AN6367
IC4 MN6163A
IC5 BA7001
IC6 µPD4053BC
IC7 BA7001
IC9 AN608P
VIDEO AMP
Q1 2SD636
Q2 2SD636
Q3 2SD636
Q4 2SD636
Q5 2SD636
Q6 2SK301
Q7 2SD636
Q8 2SD636
Q9 2SD636
Q10 2SB641
Q11 2SD636
Q12 2SK301
Q13 2SD636
Q14 2SC2206
Q15 2SD636
Q23 2SD636
Q24 2SD636
Q25 2SD636
Q40 2SD636
Q41 2SD636
QR1 UN1213
QR2 UN1213
QR3 UN1213
QR4 UN1213
QR5 UN1213
FL1 VLF0113
FL2 VLF0095
FL3 VLF0094 B.P.F. 4.43MHz
FL4 VLF0095 B.P.F. 5.06MHz
FL6 VLF0102
DL2 VLD0032
X1 VSX0129A or VSX0129B
X2 VSX0065
D1 MA165
D2 MA165
D3 MA165
D4 MA165
D6 MA165
MAIN BM
KILLER R·AMP
KILLER P·AMP
SCHMITT
90° SHIFT
ACC DET
X·TAL VCO
BURST GATE/DET
SUB BM
PAL/SECAM MODE DET
REC·P·COMP
APC·P·COMP
REC AMP
P.B AMP
VCO
BG PULSE
V GATE
4φ GATE
NDOI
CLR
MM
FSI
FRR DET
R/P
D·PLL
H.OUT
FREQ DET
SP
R/N
AFC PC
VDD
VSS
VCC
GND
REF. NO. 8000 SERIES
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13

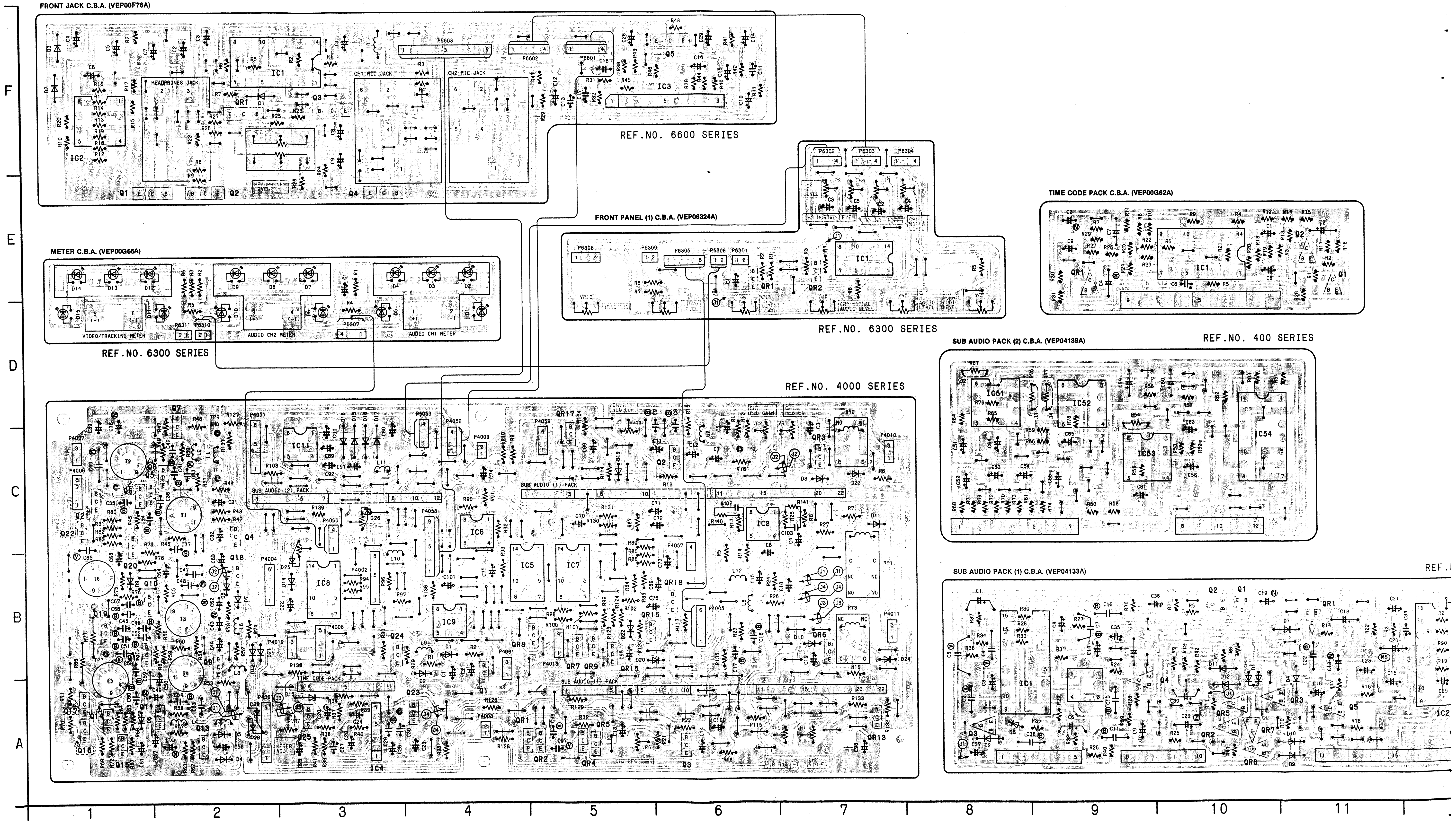
CHROMINANCE PLAYBACK SIGNAL PATH

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

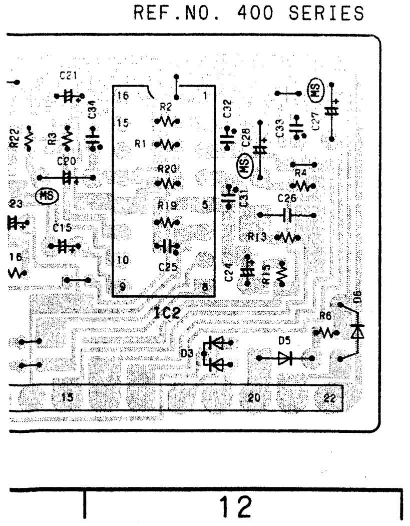
NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE WITH PAL COLOUR SIGNAL. THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL.


IC2 MN6163A
IC4 MN6163A
IC5 BA7001
IC6 µPD4053BC
IC7 BA7001
IC8 AN608P VIDEO AMP
IC9 AN608P VIDEO AMP
Q2 2SD636
Q3 2SD636
Q4 2SD636
Q5 2SD636
Q6 2SK301
Q8 2SD636
Q9 2SD636
Q10 2SB641
Q11 2SD636
Q12 2SK301
Q13 2SD636
Q14 2SC2206
Q15 2SD636
Q16 2SB643
Q17 2SD636
Q18 2SD636
Q19 2SD636
Q20 2SD636
Q21 2SB641
Q22 2SK301
Q23 2SD636
Q24 2SD636
Q25 2SD636
Q26 2SD636
Q27 2SD636
Q28 2SD636
Q29 2SD636
Q30 2SD636
Q31 2SD636
Q32 2SD636
Q33 2SD636
Q34 2SD636
Q35 2SD636
Q36 2SD636
Q37 2SD636
Q38 2SD636
Q39 2SD636
Q40 2SD636
QR3 UN1213
QR4 UN1213
QR5 UN1213
QR6 UN1213
QR7 UN1213
QR8 UN1213
QR9 UN1212
QR11 UN1213
QR12 UN1213
FL5 VLF0303
FL6 VLF0102
DL1 VLD0032
DL2 VLD0032
DL3 VLD0031
DL4 VLD0032
DL5 VLD0032
DL7 EFDHR124A13A
X2 VSX0066
TH1 ERTD2FHL102S
BG PULSE
V GATE
MM
FSI
FRR DET
R/P
4Φ GATE
D-PLL
REC
P.B
H.OUT
FREQ DET
AFC PC
SP
R/N
NDOI
CLR
VDD
VSS
VCO
SCHMITT
REC AMP
P.B AMP
REC·P·COMP
APC·P·COMP
BURST GATE/DET
SUB BM
PAL/SECAM MODE DET
MAIN BM
GND
VCC
L.P.F.
EE
VV
5
6
7
8
9
10
11
12
13
14
15
16
17
A
B
C
D
E
F
G

ORMAL AUDIO C.B.A. (VEP04132B)

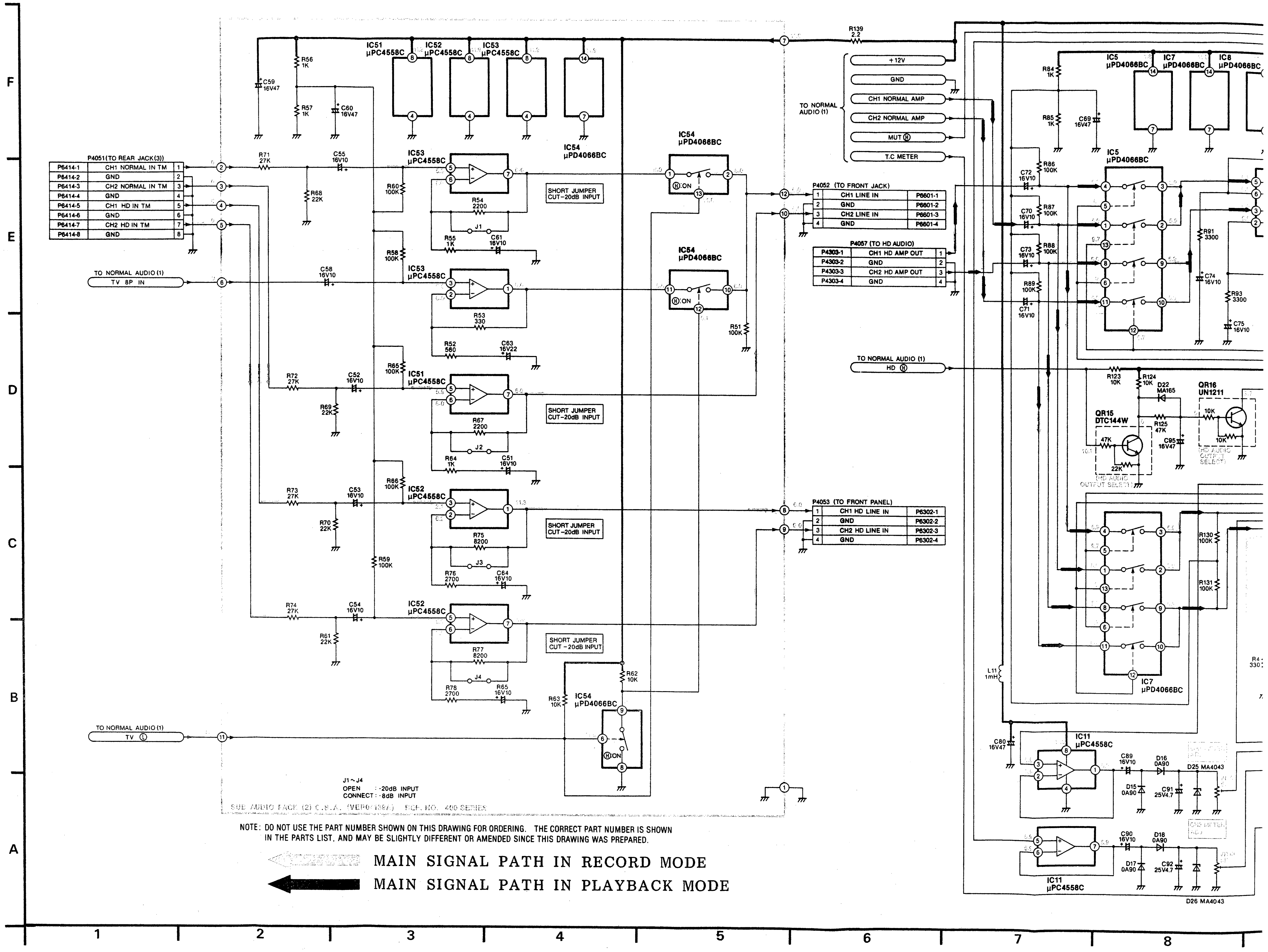

FRONT JACK C.B.A. (VEP00F76A)
REF.NO. 6600 SERIES
HEADPHONES JACK
CH1 MIC JACK
CH2 MIC JACK
HEADPHONES LEVEL
METER C.B.A. (VEP00G66A)
VIDEO/TRACKING METER
AUDIO CH2 METER
AUDIO CH1 METER
REF.NO. 6300 SERIES
FRONT PANEL (1) C.B.A. (VEP06324A)
REF.NO. 6300 SERIES
TIME CODE PACK C.B.A. (VEP00G62A)
REF.NO. 400 SERIES
SUB AUDIO PACK (2) C.B.A. (VEP04139A)
REF.NO. 4000 SERIES
SUB AUDIO (2) PACK
SUB AUDIO (1) PACK
TIME CODE PACK
SUB AUDIO PACK (1) C.B.A. (VEP04133A)
REF.
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11

NORMAL AUDIO (2) SCHEMATIC DIAGRAM


REF.NO. 400 SERIES
C21
R22
R3
C20
R1
R2
R20
R19
C26
C15
C25
R13
R4
IC2
D3
D5
R5
D6
16
15
1
9
10
8
12

Normal Audio C.B.A.	
Transistor	
Q4001	B-4
Q4002	C-6
Q4003	A-6
Q4004	C-2
Q4005	C-2
Q4006	C-1
Q4007	C-2
Q4008	C-2
Q4009	B-2
Q4010	B-1
Q4011	A-2
Q4012	B-1
Q4013	A-2
Q4014	A-1
Q4015	A-1
Q4016	A-1
Q4017	A-1
Q4018	B-2
Q4019	B-1
Q4020	C-1
Q4021	C-1
Q4022	C-1
Q4023	A-4
Q4024	B-3
Q4025	A-3
Transistor & Resistor	
QR4001	A-4
QR4002	A-5
QR4003	C-7
QR4004	A-5
QR4005	A-5
QR4006	B-7
QR4007	B-5
QR4008	B-5
QR4009	B-5
QR4013	A-7
QR4015	B-5
QR4016	B-5
QR4017	C-5
QR4018	B-6
Integrated Circuit	
IC4003	C-6
IC4004	A-3
IC4005	B-4
IC4006	C-4
IC4007	B-5
IC4008	B-3
IC4009	B-4
IC4011	C-3
Test Point	
TP4001	C-5
TP4002	C-5
TP4003	C-6
TP4004	B-7
TP4005	C-2
TP4006	C-1
TP4007	B-1
TP4008	B-1
TP4009	C-2
TP4010	A-3
Adjustment	
VR4001	C-7
VR4002	C-6
VR4003	C-5
VR4004	A-7
VR4005	A-6
VR4006	A-5
VR4007	A-3
VR4009	B-3
VR4010	C-3

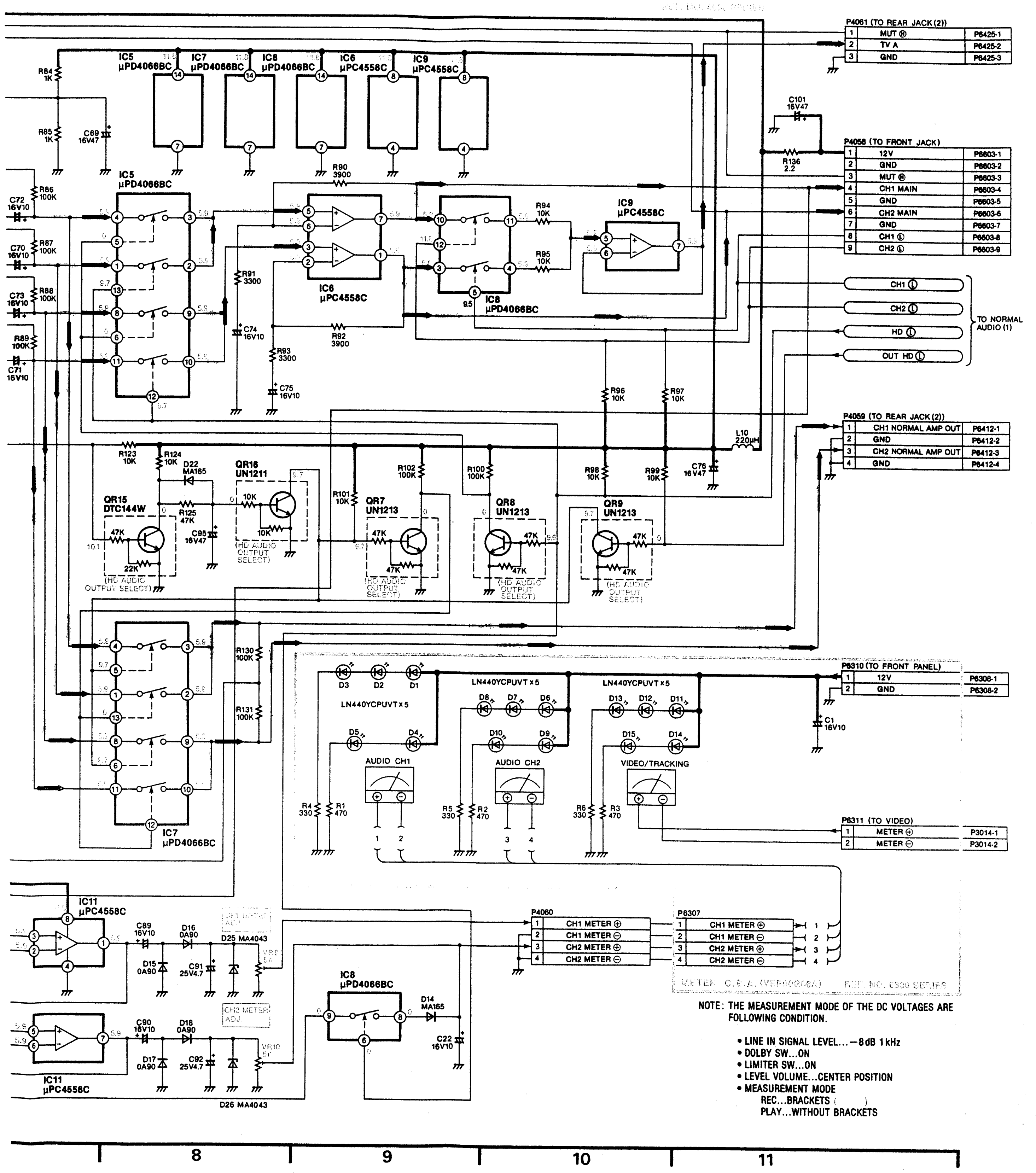
ADDRESS INFORMATION


F
E
D
C
B
A
1
2
3
4
5
6
7
8
IC51 µPC4558C
IC52 µPC4558C
IC53 µPC4558C
IC54 µPD4066BC
IC5 µPD4066BC
IC7 µPD4066BC
IC8 µPD4066BC
IC11 µPC4558C
P4051 (TO REAR JACK(3))
P6414-1 CH1 NORMAL IN TM
P6414-2 GND
P6414-3 CH2 NORMAL IN TM
P6414-4 GND
P6414-5 CH1 HD IN TM
P6414-6 GND
P6414-7 CH2 HD IN TM
P6414-8 GND
TO NORMAL AUDIO (1)
TV 8P IN
TV Ⓛ
HD Ⓗ
SHORT JUMPER CUT-20dB INPUT
Ⓗ:ON
TO NORMAL AUDIO (1)
+12V
GND
CH1 NORMAL AMP
CH2 NORMAL AMP
MUT Ⓗ
T.C METER
P4052 (TO FRONT JACK)
1 CH1 LINE IN P6601-1
2 GND P6601-2
3 CH2 LINE IN P6601-3
4 GND P6601-4
P4057 (TO HD AUDIO)
P4303-1 CH1 HD AMP OUT 1
P4303-2 GND 2
P4303-3 CH2 HD AMP OUT 3
P4303-4 GND 4
P4053 (TO FRONT PANEL)
1 CH1 HD LINE IN P6302-1
2 GND P6302-2
3 CH2 HD LINE IN P6302-3
4 GND P6302-4
QR15 DTC144W
QR16 UN1211
D22 MA165
D16 0A90
D18 0A90
D15 0A90
D17 0A90
D25 MA4043
D26 MA4043
L11 1mH
R139 2.2
J1~J4
OPEN : -20dB INPUT
CONNECT : -8dB INPUT
SUB AUDIO PACK (2) C.B.A. (VEP0?138?) REF. NO. 400 SERIES

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

⇦ MAIN SIGNAL PATH IN RECORD MODE

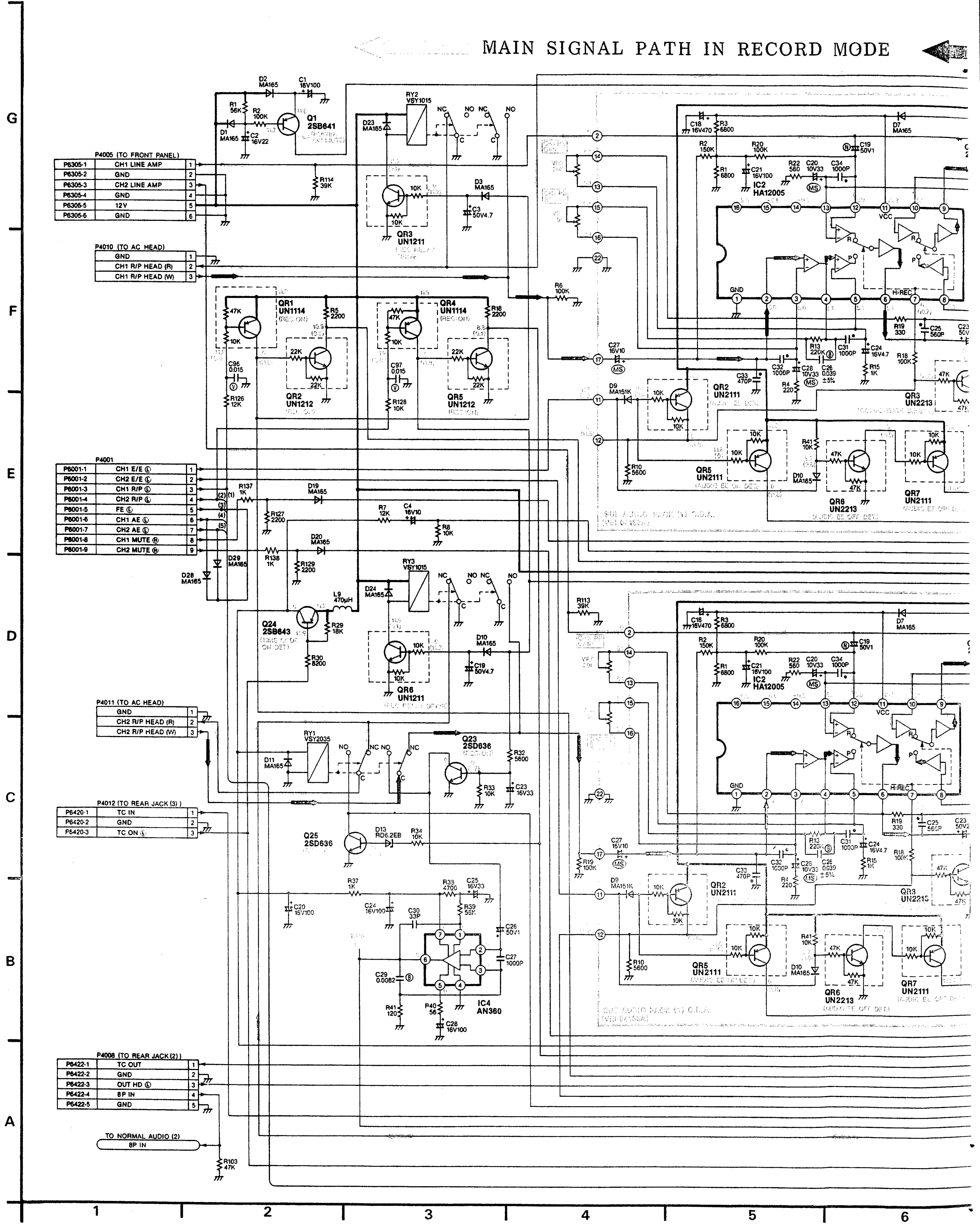
⬅ MAIN SIGNAL PATH IN PLAYBACK MODE


IC5 μPD4066BC
IC7 μPD4066BC
IC8 μPD4066BC
IC6 μPC4558C
IC9 μPC4558C
IC11 μPC4558C
P4061 (TO REAR JACK (2))
1 MUT Ⓡ P6425-1
2 TV A P6425-2
3 GND P6425-3
P4058 (TO FRONT JACK)
1 12V P6803-1
2 GND P6803-2
3 MUT Ⓡ P6803-3
4 CH1 MAIN P6803-4
5 GND P6803-5
6 CH2 MAIN P6803-6
7 GND P6803-7
8 CH1 Ⓛ P6803-8
9 CH2 Ⓛ P6803-9
CH1 Ⓛ
CH2 Ⓛ
HD Ⓛ
OUT HD Ⓛ
TO NORMAL AUDIO (1)
P4059 (TO REAR JACK (2))
1 CH1 NORMAL AMP OUT P6412-1
2 GND P6412-2
3 CH2 NORMAL AMP OUT P6412-3
4 GND P6412-4
QR15 DTC144W
QR16 UN1211
QR7 UN1213
QR8 UN1213
QR9 UN1213
(HD AUDIO OUTPUT SELECT)
P6310 (TO FRONT PANEL)
1 12V P6308-1
2 GND P6308-2
LN440YCPUVT x 5
AUDIO CH1
AUDIO CH2
VIDEO/TRACKING
P6311 (TO VIDEO)
1 METER ⊕ P3014-1
2 METER ⊖ P3014-2
P4060
P6307
1 CH1 METER ⊕
2 CH1 METER ⊖
3 CH2 METER ⊕
4 CH2 METER ⊖
METER C.B.A.
REF. NO. 6300 SERIES
CH2 METER ADJ
D25 MA4043
D26 MA4043
8
9
10
11

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGES ARE FOLLOWING CONDITION.

- LINE IN SIGNAL LEVEL…−8dB 1kHz
- DOLBY SW…ON
- LIMITER SW…ON
- LEVEL VOLUME…CENTER POSITION
- MEASUREMENT MODE
  REC…BRACKETS ( )
  PLAY…WITHOUT BRACKETS

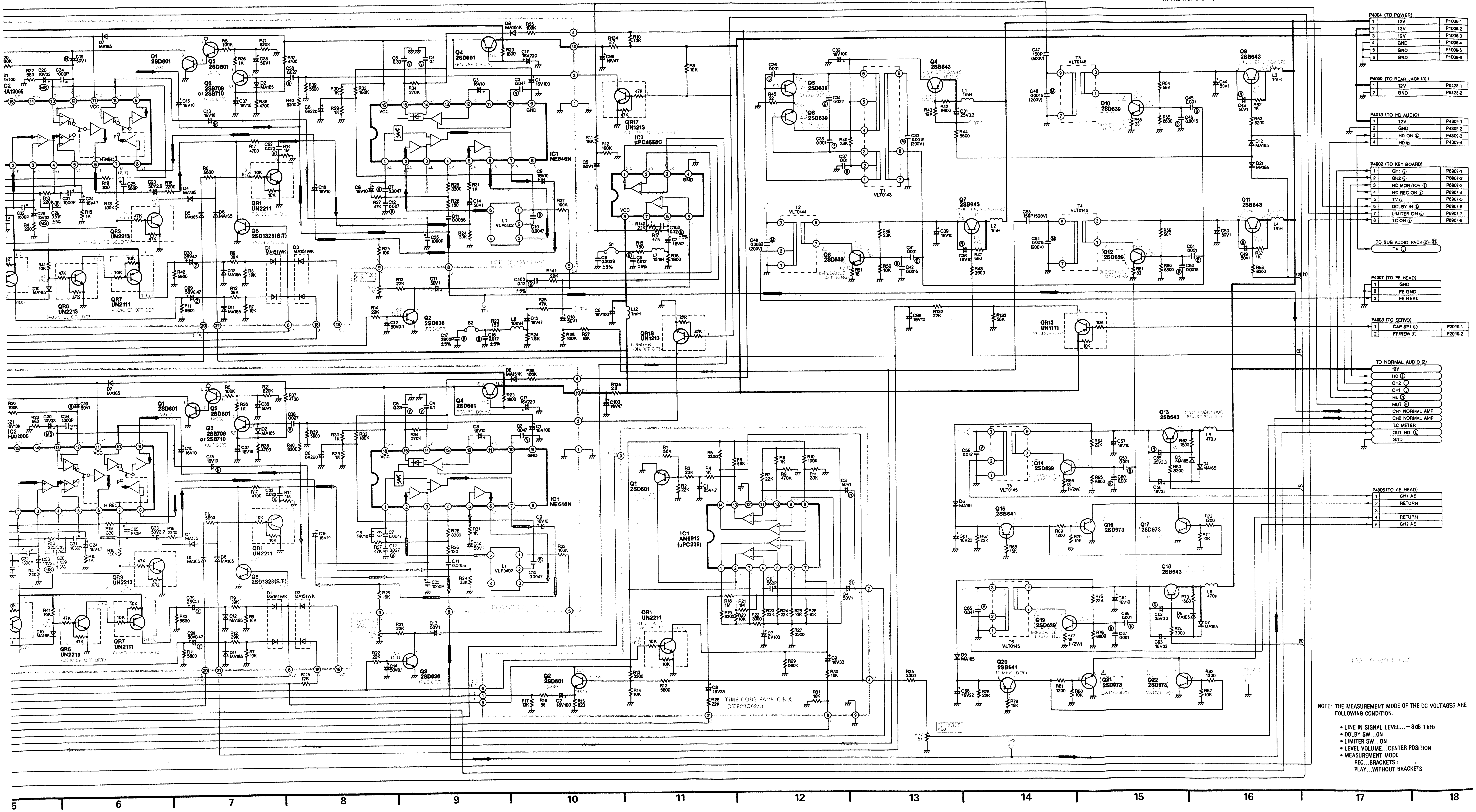
NORMAL AUDIO (1) SCHEMATIC DIAGRAM


MAIN SIGNAL PATH IN RECORD MODE
G
F
E
D
C
B
A
P4005 (TO FRONT PANEL)
P6305-1 CH1 LINE AMP 1
P6305-2 GND 2
P6305-3 CH2 LINE AMP 3
P6305-4 GND 4
P6305-5 12V 5
P6305-6 GND 6
P4010 (TO AC HEAD)
GND 1
CH1 R/P HEAD (R) 2
CH1 R/P HEAD (W) 3
Q1 2SB641
RY2 VSY1015
QR3 UN1211
IC2 HA12005
QR1 UN1114
QR4 UN1114
QR2 UN1212
QR5 UN1212
P4001
P6001-1 CH1 E/E Ⓛ 1
P6001-2 CH2 E/E Ⓛ 2
P6001-3 CH1 R/P Ⓛ 3
P6001-4 CH2 R/P Ⓛ 4
P6001-5 FE Ⓛ 5
P6001-6 CH1 AE Ⓛ 6
P6001-7 CH2 AE Ⓛ 7
P6001-8 CH1 MUTE Ⓗ 8
P6001-9 CH2 MUTE Ⓗ 9
RY3 VSY1015
Q24 2SB643
QR6 UN1211
P4011 (TO AC HEAD)
GND 1
CH2 R/P HEAD (R) 2
CH2 R/P HEAD (W) 3
RY1 VSY2035
Q23 2SD636
P4012 (TO REAR JACK (3))
P6420-1 TC IN 1
P6420-2 GND 2
P6420-3 TC ON Ⓛ 3
Q25 2SD636
IC4 AN360
QR2 UN2111
QR3 UN2213
QR5 UN2111
QR6 UN2213
QR7 UN2111
P4008 (TO REAR JACK (2))
P6422-1 TC OUT 1
P6422-2 GND 2
P6422-3 OUT HD Ⓛ 3
P6422-4 8P IN 4
P6422-5 GND 5
TO NORMAL AUDIO (2) 8P IN
1
2
3
4
5
6

ECORD MODE ◀ MAIN SIGNAL PATH IN PLAYBACK MODE

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.
WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.



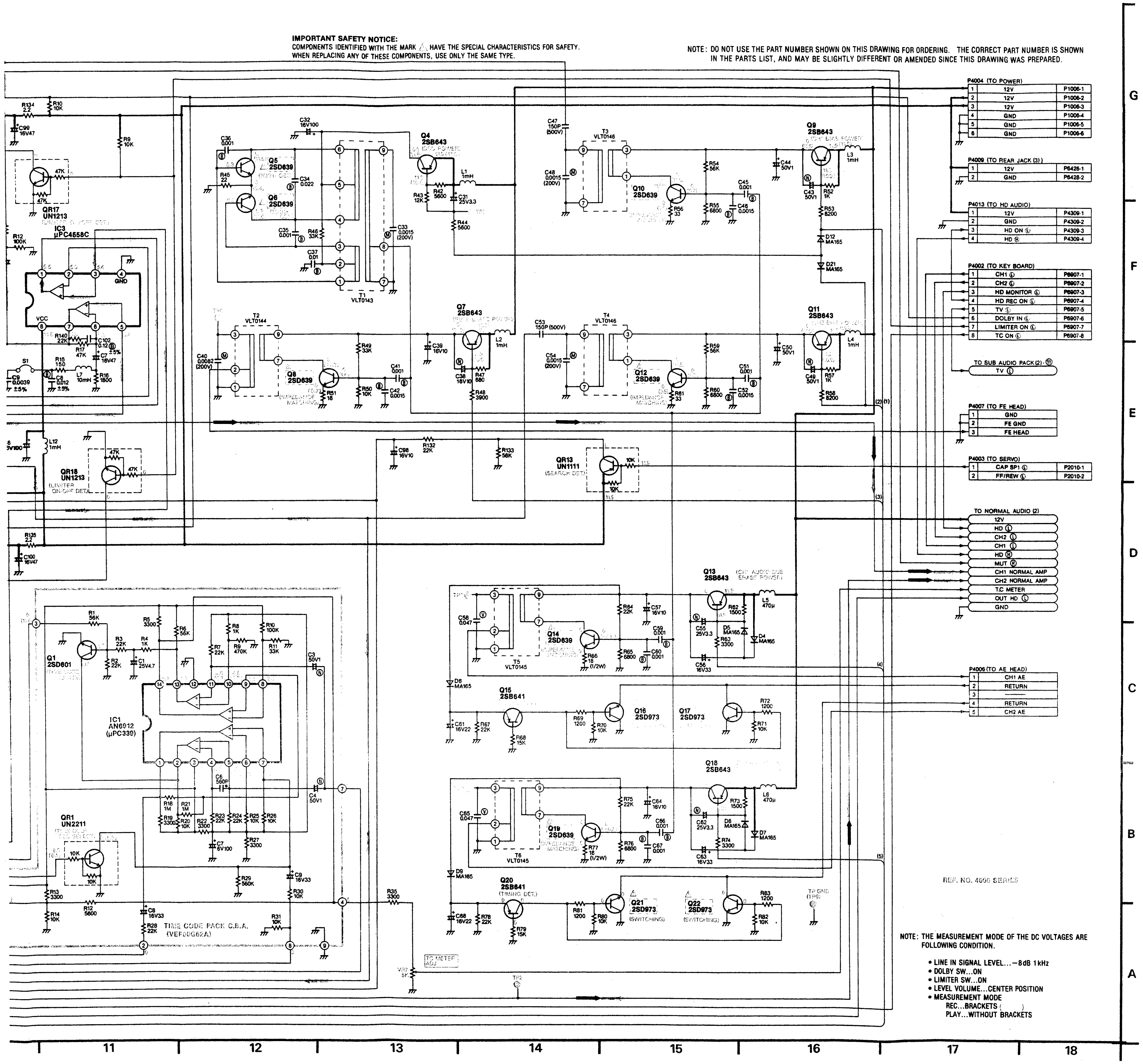
IC1 NE646N
IC2 HA12005
IC3 μPC4558C
IC1 AN6912 (μPC339)
Q1 2SD601
Q2 2SD601
Q3 2SB709 or 2SB710
Q4 2SD601
Q5 2SD1328(S.T)
QR1 UN2211
QR3 UN2213
QR6 UN2213
QR7 UN2111
QR17 UN1213
QR18 UN1213
QR13 UN1111
Q2 2SD636
Q3 2SD636
Q4 2SB643
Q5 2SD639
Q6 2SD639
Q7 2SB643
Q8 2SD639
Q9 2SB643
Q10 2SD639
Q11 2SB643
Q12 2SD639
Q13 2SB643
Q14 2SD639
Q15 2SB641
Q16 2SD973
Q17 2SD973
Q18 2SB643
Q19 2SD639
Q20 2SB641
Q21 2SD973
Q22 2SD973
T1 VLT0143
T2 VLT0144
T3 VLT0145
T4 VLT0146
T5 VLT0145
T6 VLT0145
L1 VLF0402
TIME CODE PACK C.B.A. (VEPR9043A)
P4004 (TO POWER)
1 12V P1006-1
2 12V P1006-2
3 12V P1006-3
4 GND P1006-4
5 GND P1006-5
6 GND P1006-6
P4009 (TO REAR JACK (3))
1 12V P6428-1
2 GND P6428-2
P4013 (TO HD AUDIO)
1 12V P4309-1
2 GND P4309-2
3 HD ON Ⓛ P4309-3
4 HD Ⓗ P4309-4
P4002 (TO KEY BOARD)
1 CH1 Ⓛ P6907-1
2 CH2 Ⓛ P6907-2
3 HD MONITOR Ⓛ P6907-3
4 HD REC ON Ⓛ P6907-4
5 TV Ⓛ P6907-5
6 DOLBY IN Ⓛ P6907-6
7 LIMITER ON Ⓛ P6907-7
8 TC ON Ⓛ P6907-8
TO SUB AUDIO PACK (2)·⑪
TV Ⓛ
P4007 (TO FE HEAD)
1 GND
2 FE GND
3 FE HEAD
P4003 (TO SERVO)
1 CAP SP1 Ⓛ P2010-1
2 FF/REW Ⓛ P2010-2
TO NORMAL AUDIO (2)
12V
HD Ⓛ
CH2 Ⓛ
CH1 Ⓛ
HD Ⓗ
MUT Ⓗ
CH1 NORMAL AMP
CH2 NORMAL AMP
T.C METER
OUT HD Ⓛ
GND
P4006 (TO AE HEAD)
1 CH1 AE
2 RETURN
3 ——
4 RETURN
5 CH2 AE
5
6
7
8
9
10
11
12
13
14
15
16
17
18

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGES ARE FOLLOWING CONDITION.

- LINE IN SIGNAL LEVEL...−8dB 1kHz
- DOLBY SW...ON
- LIMITER SW...ON
- LEVEL VOLUME...CENTER POSITION
- MEASUREMENT MODE
  REC...BRACKETS ( )
  PLAY...WITHOUT BRACKETS

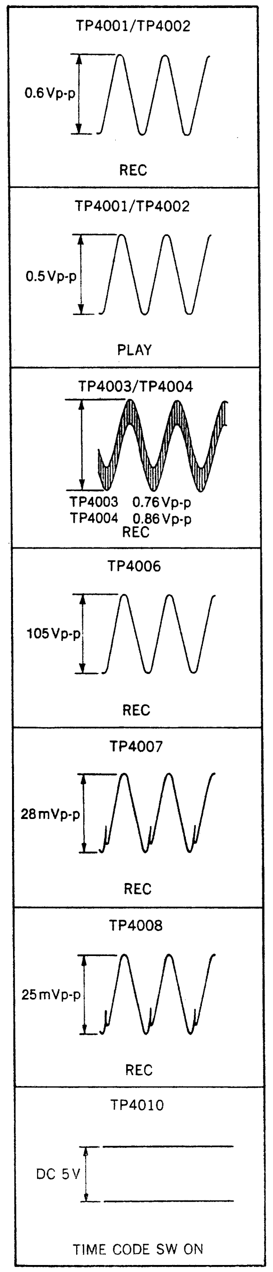
IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.
WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.

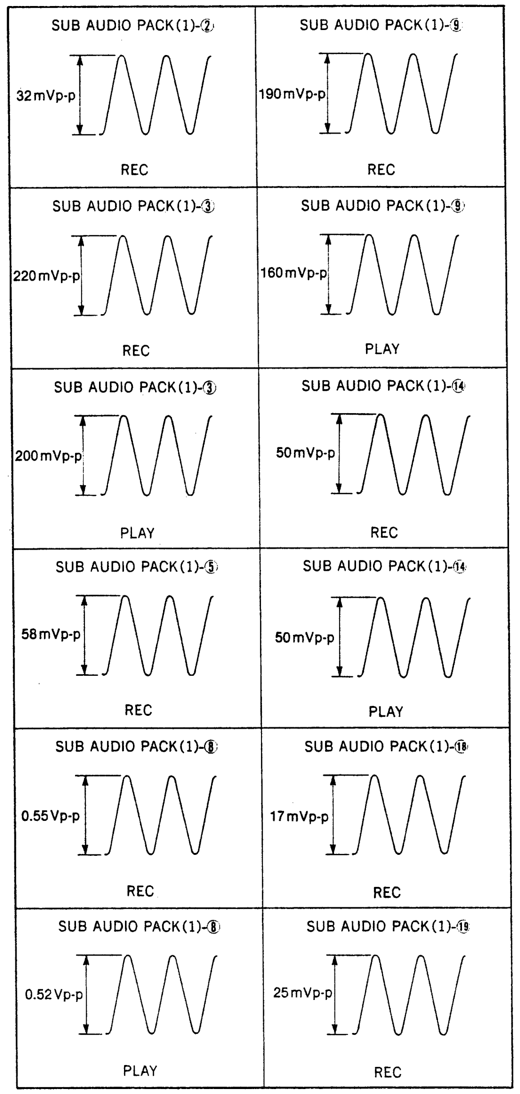
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

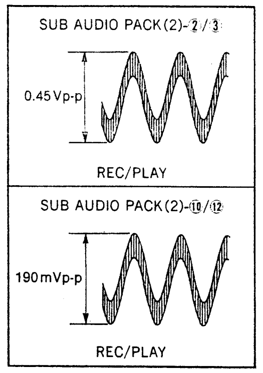

G
F
E
D
C
B
A
11
12
13
14
15
16
17
18
QR17 UN1213
IC3 μPC4558C
GND
VCC
S1
QR18 UN1213
Q4 2SB643
Q5 2SD639
Q6 2SD639
T1 VLT0143
T2 VLT0144
Q7 2SB643
Q8 2SD639
T3 VLT0146
Q9 2SB643
Q10 2SD639
T4 VLT0146
Q11 2SB643
Q12 2SD639
QR13 UN1111
Q13 2SB643
Q14 2SD639
T5 VLT0145
Q15 2SB641
Q16 2SD973
Q17 2SD973
Q18 2SB643
Q19 2SD639
T6 VLT0145
Q20 2SB641
Q21 2SD973
Q22 2SD973
Q1 2SD601
IC1 AN6912 (μPC339)
QR1 UN2211
TIME CODE PACK C.B.A. (VEP80G62A)
P4004 (TO POWER)
1 12V P1006-1
2 12V P1006-2
3 12V P1006-3
4 GND P1006-4
5 GND P1006-5
6 GND P1006-6
P4009 (TO REAR JACK (3))
1 12V P6428-1
2 GND P6428-2
P4013 (TO HD AUDIO)
1 12V P4309-1
2 GND P4309-2
3 HD ON Ⓛ P4309-3
4 HD Ⓗ P4309-4
P4002 (TO KEY BOARD)
1 CH1 Ⓛ P6907-1
2 CH2 Ⓛ P6907-2
3 HD MONITOR Ⓛ P6907-3
4 HD REC ON Ⓛ P6907-4
5 TV Ⓛ P6907-5
6 DOLBY IN Ⓛ P6907-6
7 LIMITER ON Ⓛ P6907-7
8 TC ON Ⓛ P6907-8
TO SUB AUDIO PACK (2)-⑪
TV Ⓛ
P4007 (TO FE HEAD)
1 GND
2 FE GND
3 FE HEAD
P4003 (TO SERVO)
1 CAP SP1 Ⓛ P2010-1
2 FF/REW Ⓛ P2010-2
TO NORMAL AUDIO (2)
12V
HD Ⓛ
CH2 Ⓛ
CH1 Ⓛ
HD Ⓗ
MUT Ⓗ
CH1 NORMAL AMP
CH2 NORMAL AMP
T.C METER
OUT HD Ⓛ
GND
P4006 (TO AE HEAD)
1 CH1 AE
2 RETURN
3 ———
4 RETURN
5 CH2 AE
REF. NO. 4000 SERIES

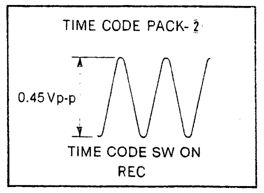
NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGES ARE FOLLOWING CONDITION.

- LINE IN SIGNAL LEVEL...−8dB 1kHz
- DOLBY SW...ON
- LIMITER SW...ON
- LEVEL VOLUME...CENTER POSITION
- MEASUREMENT MODE
  REC...BRACKETS ( )
  PLAY...WITHOUT BRACKETS

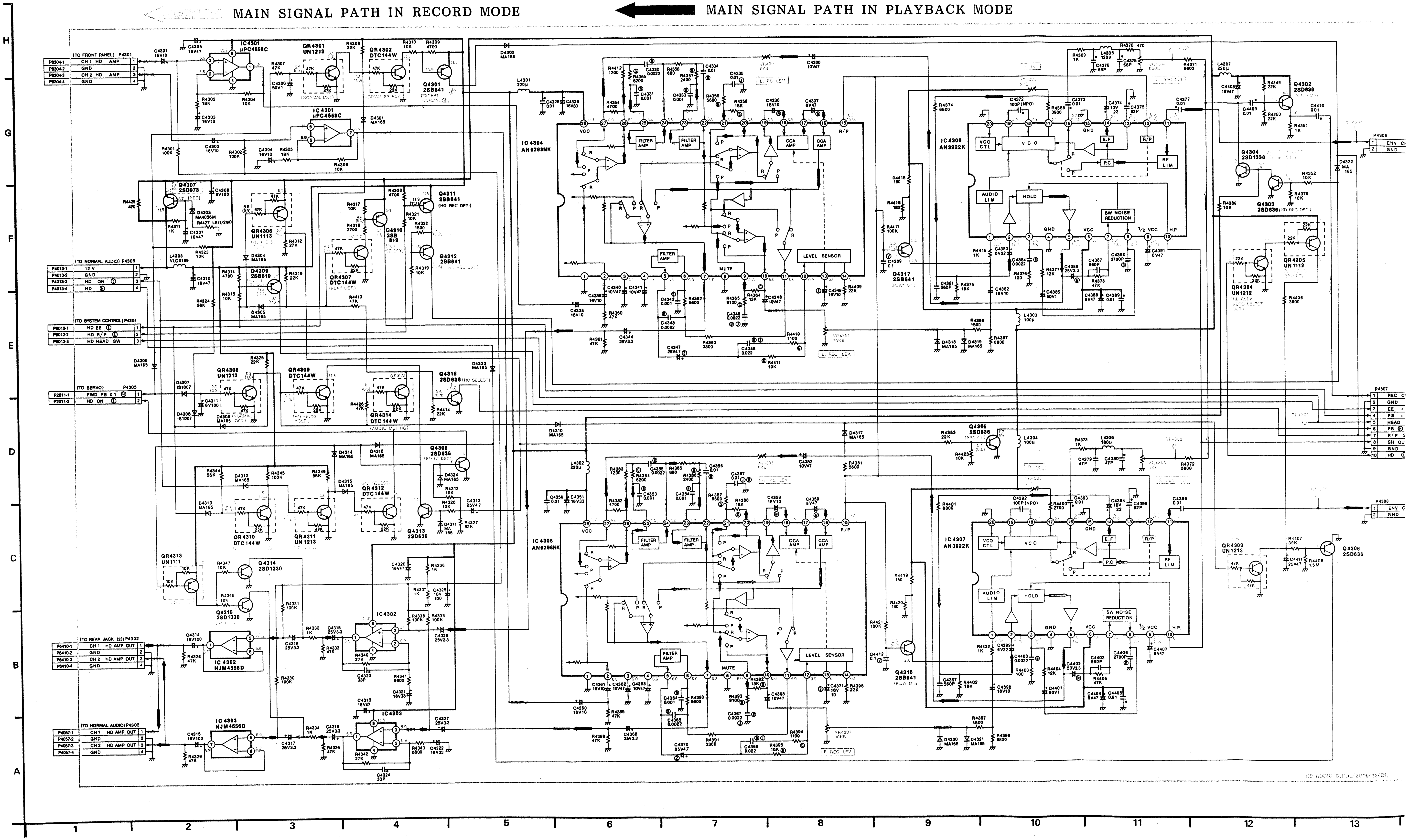


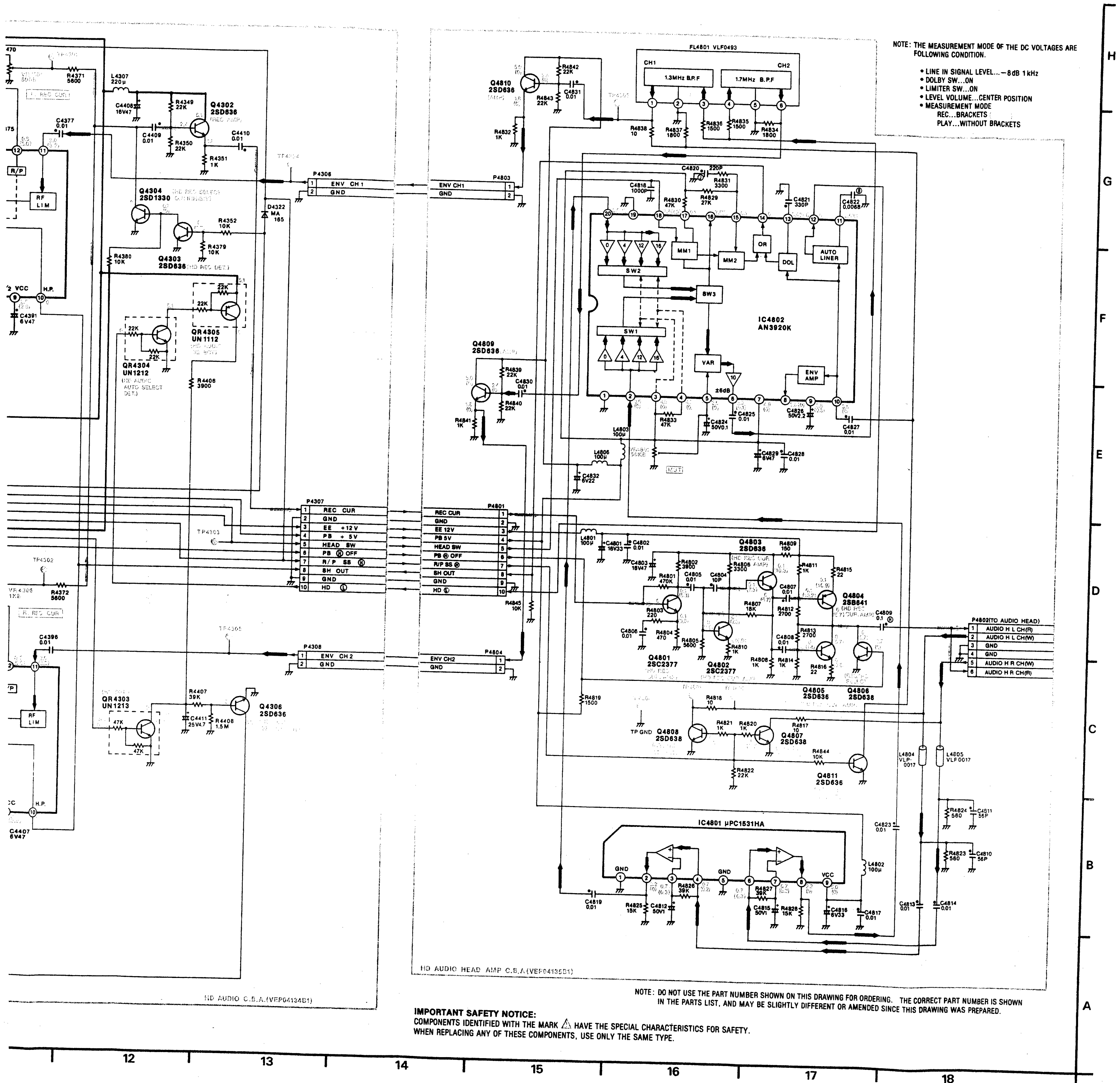






HD AUDIO & HD AUDIO HEAD AMP SCHEMATIC DIAGRAM


MAIN SIGNAL PATH IN RECORD MODE
MAIN SIGNAL PATH IN PLAYBACK MODE
(TO FRONT PANEL) P4301
P6304-1 CH 1 HD AMP
P6304-2 GND
P6304-3 CH 2 HD AMP
P6304-4 GND
IC4301 μPC4558C
QR4301 UN1213
QR4302 DTC144W
Q4301 2SB641
D4302 MA165
D4301 MA165
Q4307 2SD973
D4303 MA4056M
QR4306 UN1113
Q4310 2SB819
Q4311 2SB641 (HD REC DET.)
Q4312 2SB641
(TO NORMAL AUDIO) P4309
P4013-1 12 V
P4013-2 GND
P4013-3 HD ON
P4013-4 HD
Q4309 2SB819
QR4307 DTC144W
D4304 MA165
D4305 MA165
(TO SYSTEM CONTROL) P4304
P6012-1 HD EE
P6012-2 HD R/P
P6012-3 HD HEAD SW
D4306 MA165
QR4308 UN1213
QR4309 DTC144W
QR4314 DTC144W
Q4316 2SD636 (HD SELECT)
D4323 MA165
(TO SERVO) P4305
P2011-1 FWD PB X 1
P2011-2 HD ON
D4307 1S1007
D4308 1S1007
D4309 MA165
D4314 MA165
D4316 MA165
D4312 MA165
D4313 MA165
D4315 MA165
Q4308 2SD636
D4324 MA165
QR4310 DTC144W
QR4311 UN1213
QR4312 DTC144W
Q4313 2SD636
D4311 MA165
QR4313 UN1111
Q4314 2SD1330
Q4315 2SD1330
IC4302
IC4302 NJM4556D
(TO REAR JACK (2)) P4302
P6410-1 CH 1 HD AMP OUT
P6410-2 GND
P6410-3 CH 2 HD AMP OUT
P6410-4 GND
IC4303
IC4303 NJM4556D
(TO NORMAL AUDIO) P4303
P4057-1 CH1 HD AMP OUT
P4057-2 GND
P4057-3 CH 2 HD AMP OUT
P4057-4 GND
IC4304 AN6298NK
IC4305 AN6298NK
VCC
FILTER AMP
CCA AMP
LEVEL SENSOR
MUTE
R/P
L. PB. LEV.
L. REC. LEV.
R. PB. LEV.
R. REC. LEV.
D4310 MA165
D4317 MA165
Q4317 2SB641 (PLAY ON)
Q4318 2SB641 (PLAY ON)
Q4305 2SD636
IC4306 AN3922K
IC4307 AN3922K
VCO CTL
VCO
E.F
P.C
RF LIM
AUDIO LIM
HOLD
SW NOISE REDUCTION
GND
1/2 VCC
H.P.
D4318 MA165
D4319 MA165
D4320 MA165
D4321 MA165
Q4302 2SD636
Q4304 2SD1330
Q4303 2SD636 (HD REC DET.)
D4322 MA165
QR4305 UN1112
QR4304 UN1212
QR4303 UN1213
Q4306 2SD636
P4308
1 ENV C
2 GND
P4307
1 REC C
2 GND
3 EE +
4 PB +
5 HEAD
6 PB
7 R/P S
8 SH OU
9 GND
10 HD
P4308
1 ENV C
2 GND
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13

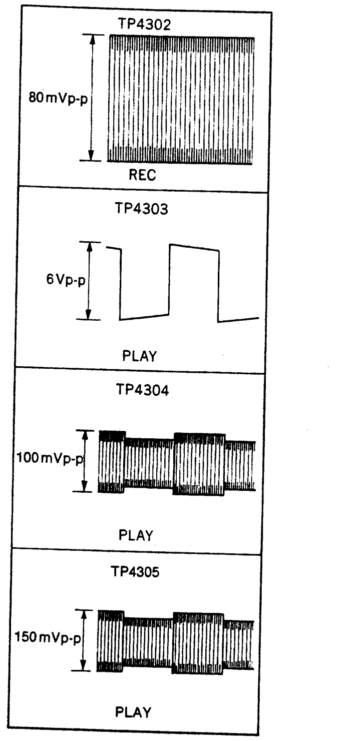

FL4801 VLF0493
CH1
CH2
1.3MHz B.P.F
1.7MHz B.P.F
IC4802 AN3920K
SW1
SW2
SW3
MM1
MM2
OR
DOL
AUTO LINER
VAR
ENV AMP
IC4801 μPC1531HA
GND
VCC
Q4801 2SC2377
Q4802 2SC2377
Q4803 2SD636
Q4804 2SB641
Q4805 2SD636
Q4806 2SD638
Q4807 2SD638
Q4808 2SD638
Q4809 2SD638
Q4810 2SD636
Q4811 2SD636
Q4302 2SD636
Q4303 2SD636
Q4304 2SD1330
Q4306 2SD636
QR4303 UN1213
QR4304 UN1212
QR4305 UN1112
P4306
P4307
P4308
P4801
P4803
P4804
P4802(TO AUDIO HEAD)
ENV CH1
ENV CH2
GND
REC CUR
EE +12V
PB +5V
HEAD SW
PB ⓢ OFF
R/P SS ⓢ
SH OUT
HD ⓢ
AUDIO H L CH(R)
AUDIO H L CH(W)
AUDIO H R CH(W)
AUDIO H R CH(R)
RF LIM
R/P
H.P.
VCC
HD AUDIO HEAD AMP C.B.A (VEP04135D1)
HD AUDIO C.B.A (VEP04134B1)
H
G
F
E
D
C
B
A
12
13
14
15
16
17
18

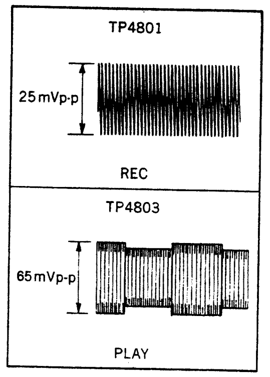
NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGES ARE FOLLOWING CONDITION.

- LINE IN SIGNAL LEVEL...−8dB 1kHz
- DOLBY SW...ON
- LIMITER SW...ON
- LEVEL VOLUME...CENTER POSITION
- MEASUREMENT MODE
  REC...BRACKETS ( )
  PLAY...WITHOUT BRACKETS

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.
WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.





HD Audio C.B.A.	
Transistor	
Q4301	C-1
Q4302	C-3
Q4303	C-3
Q4304	C-3
Q4305	B-3
Q4306	A-2
Q4307	B-1
Q4308	B-3
Q4309	B-1
Q4310	C-2
Q4311	C-2
Q4312	C-2
Q4313	A-3
Q4314	B-4
Q4315	A-4
Q4316	C-2
Q4317	C-5
Q4318	B-5
Transistor & Resistor	
QR4301	C-2
QR4302	C-1
QR4303	A-3
QR4304	A-2
QR4305	A-2
QR4306	B-2
QR4307	C-2
QR4308	B-3
QR4309	A-3
QR4310	B-2
QR4311	B-3
QR4312	B-3
QR4313	B-3
QR4314	B-2
Integrated Circuit	
IC4301	B-7
IC4302	C-4
IC4303	A-4
IC4304	C-6
IC4305	A-6
IC4306	C-5
IC4307	A-5
Test Point	
TP4301	C-4
TP4302	B-4
TP4303	C-1
TP4304	C-4
TP4305	A-4
Adjustment	
VR4301	C-6
VR4302	C-5
VR4303	B-5
VR4304	C-4
VR4305	B-4
VR4306	B-6
VR4307	B-5
VR4308	A-5

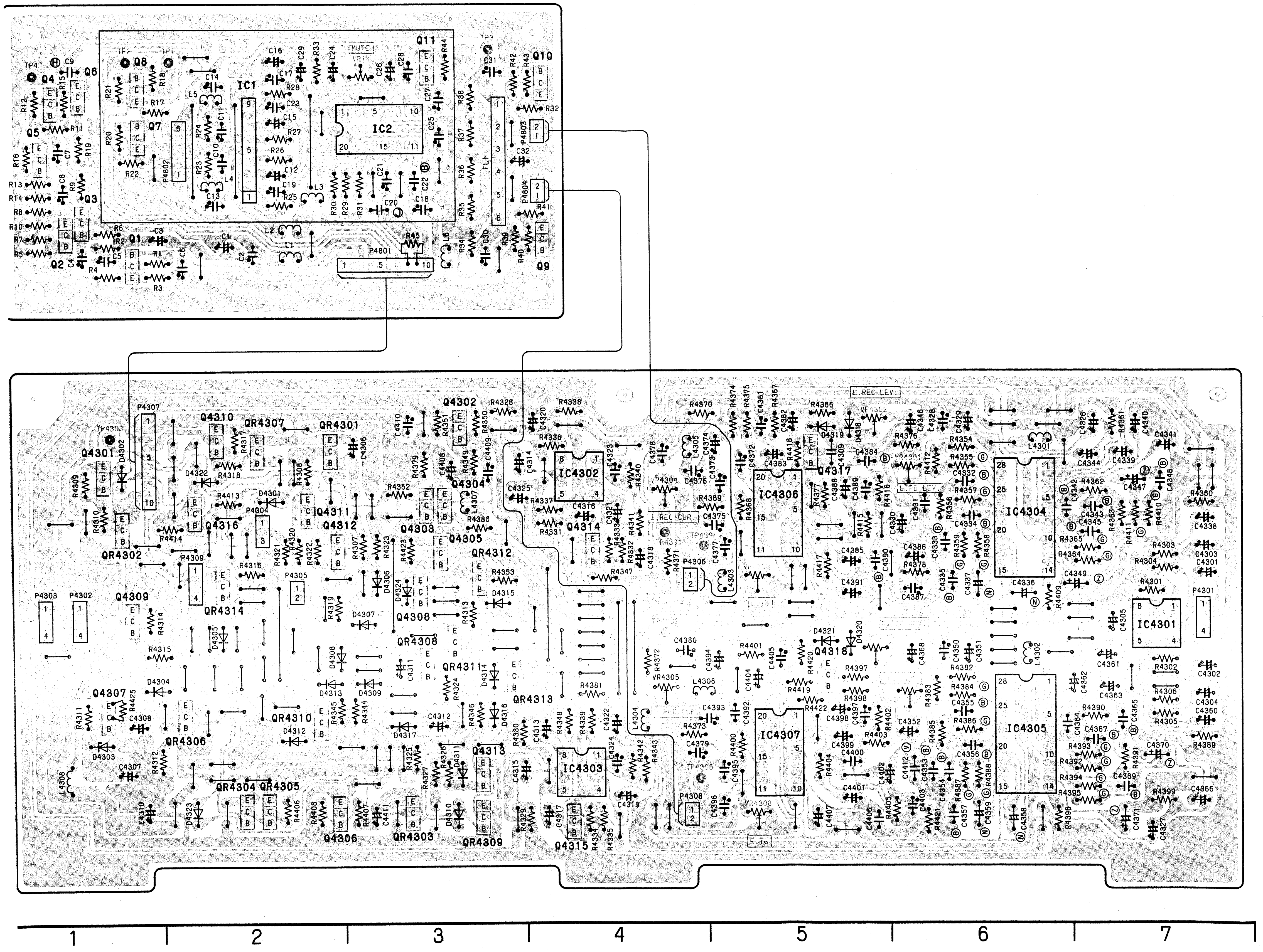
ADDRESS INFORMATION

HD Audio Head Amp C.B.A.	
Transistor	
Q4801	D-1
Q4802	D-1
Q4803	D-1
Q4804	E-1
Q4805	E-1
Q4806	E-1
Q4807	E-1
Q4808	E-1
Q4809	D-4
Q4810	E-4
Q4811	E-3
Integrated Circuit	
IC4801	E-2
IC4802	E-3
Test Point	
TP4801	E-2
TP4802	E-1
TP4803	E-3
TP4804	E-1
Adjustment	
VR4801	E-3

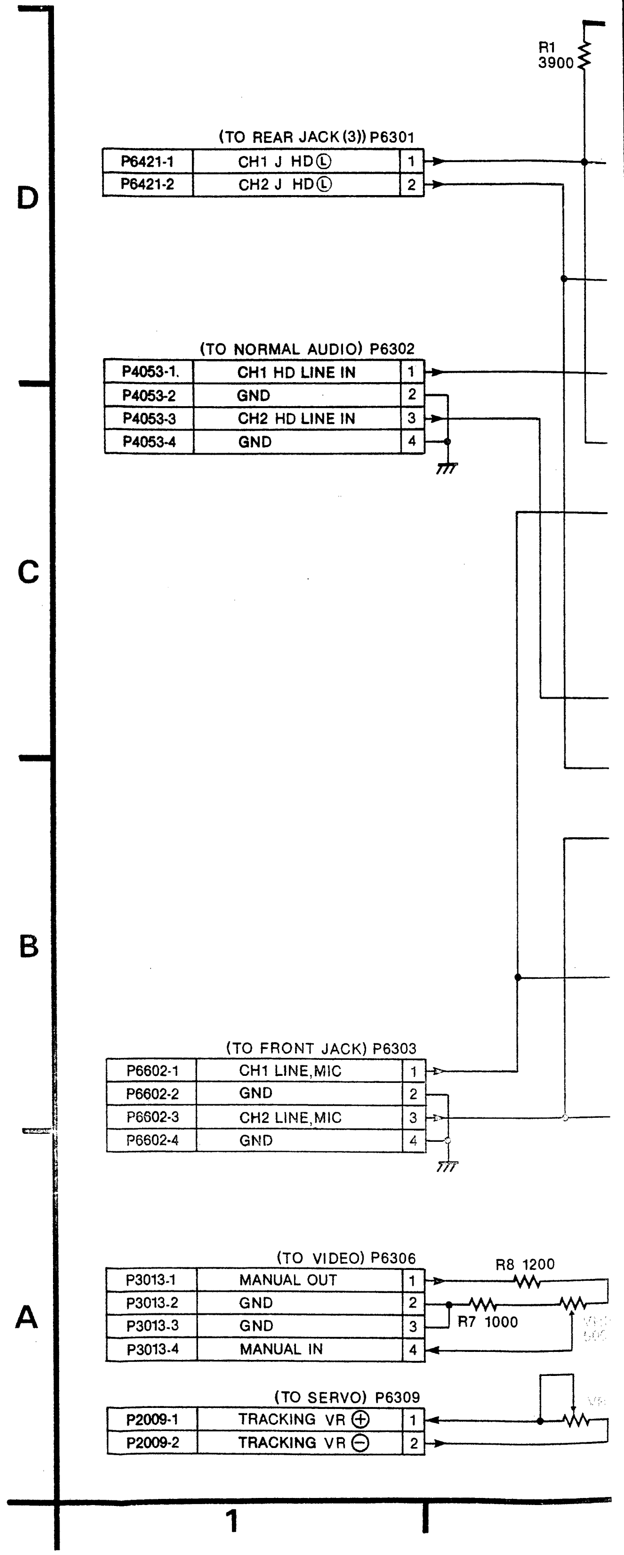
ADDRESS INFORMATION

AUDIO C.B.A. (VEP04134B1) & HD AUDIO HEAD AMP C.B.A. (VEP04135B1)

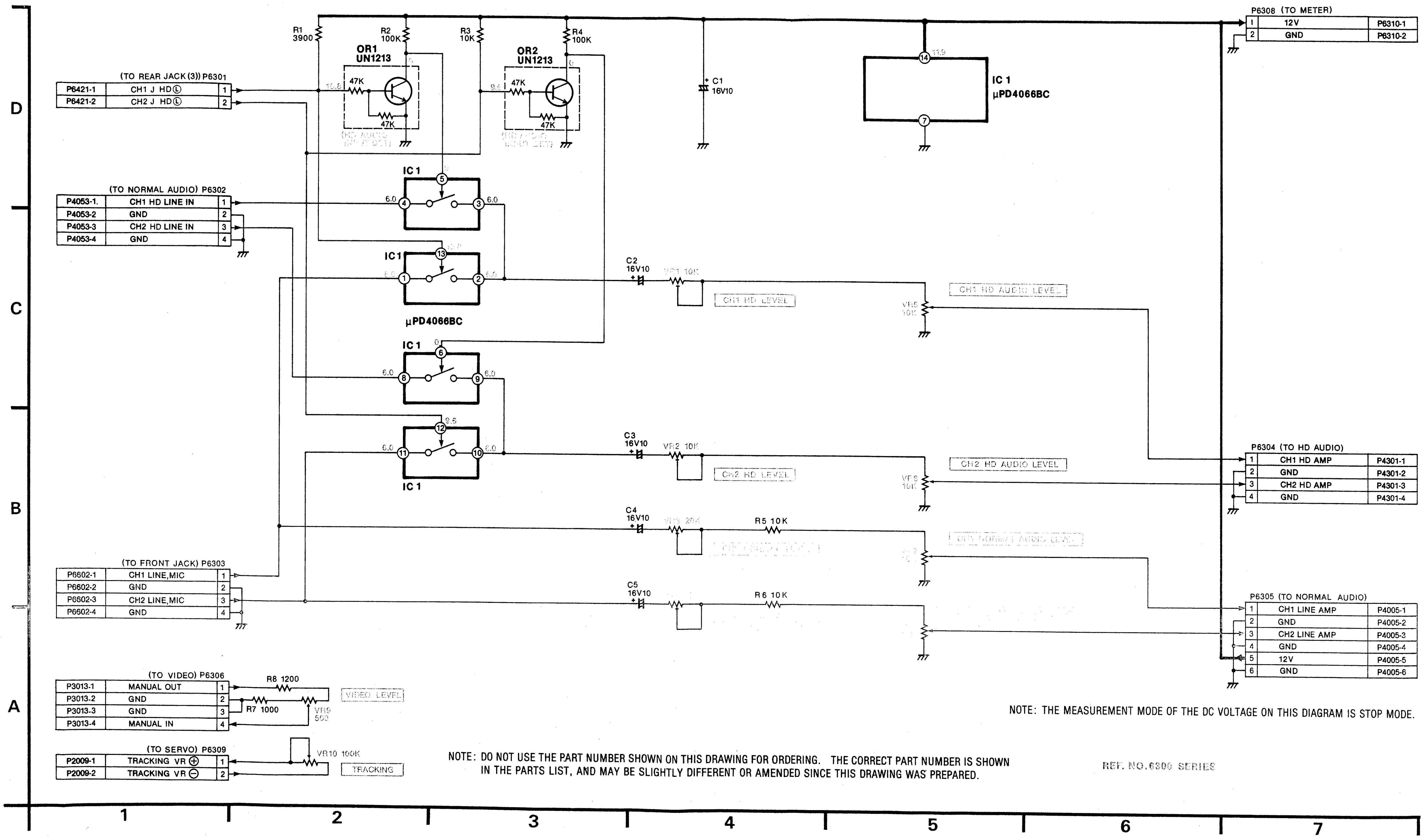
REF.NO.4800 SERIES


Q4
Q5
Q6
Q7
Q8
Q1
Q2
Q3
Q9
Q10
Q11
IC1
IC2
MUTE
P4801
P4802
P4803
P4804
FL1
TP1
TP2
TP3
TP4
P4307
P4303
P4302
P4304
P4305
P4309
P4306
P4308
P4301
Q4301
Q4302
Q4303
Q4304
Q4305
Q4306
Q4307
Q4308
Q4309
Q4310
Q4311
Q4312
Q4313
Q4314
Q4315
Q4316
Q4317
Q4318
QR4301
QR4302
QR4303
QR4304
QR4305
QR4306
QR4307
QR4308
QR4309
QR4310
QR4311
QR4312
QR4313
QR4314
IC4301
IC4302
IC4303
IC4304
IC4305
IC4306
IC4307
VR4301
VR4302
VR4304
VR4305
VR4308
L.REC LEV.
L.REC CUR.
1
2
3
4
5
6
7

FRONT PANEL SCHEMATIC


D
C
B
A
1
R1
3900
(TO REAR JACK (3)) P6301
P6421-1
CH1 J HDⓁ
1
P6421-2
CH2 J HDⓁ
2
(TO NORMAL AUDIO) P6302
P4053-1.
CH1 HD LINE IN
1
P4053-2
GND
2
P4053-3
CH2 HD LINE IN
3
P4053-4
GND
4
(TO FRONT JACK) P6303
P6602-1
CH1 LINE,MIC
1
P6602-2
GND
2
P6602-3
CH2 LINE,MIC
3
P6602-4
GND
4
(TO VIDEO) P6306
P3013-1
MANUAL OUT
1
P3013-2
GND
2
P3013-3
GND
3
P3013-4
MANUAL IN
4
R8 1200
R7 1000
(TO SERVO) P6309
P2009-1
TRACKING VR ⊕
1
P2009-2
TRACKING VR ⊖
2

FRONT PANEL SCHEMATIC DIAGRAM

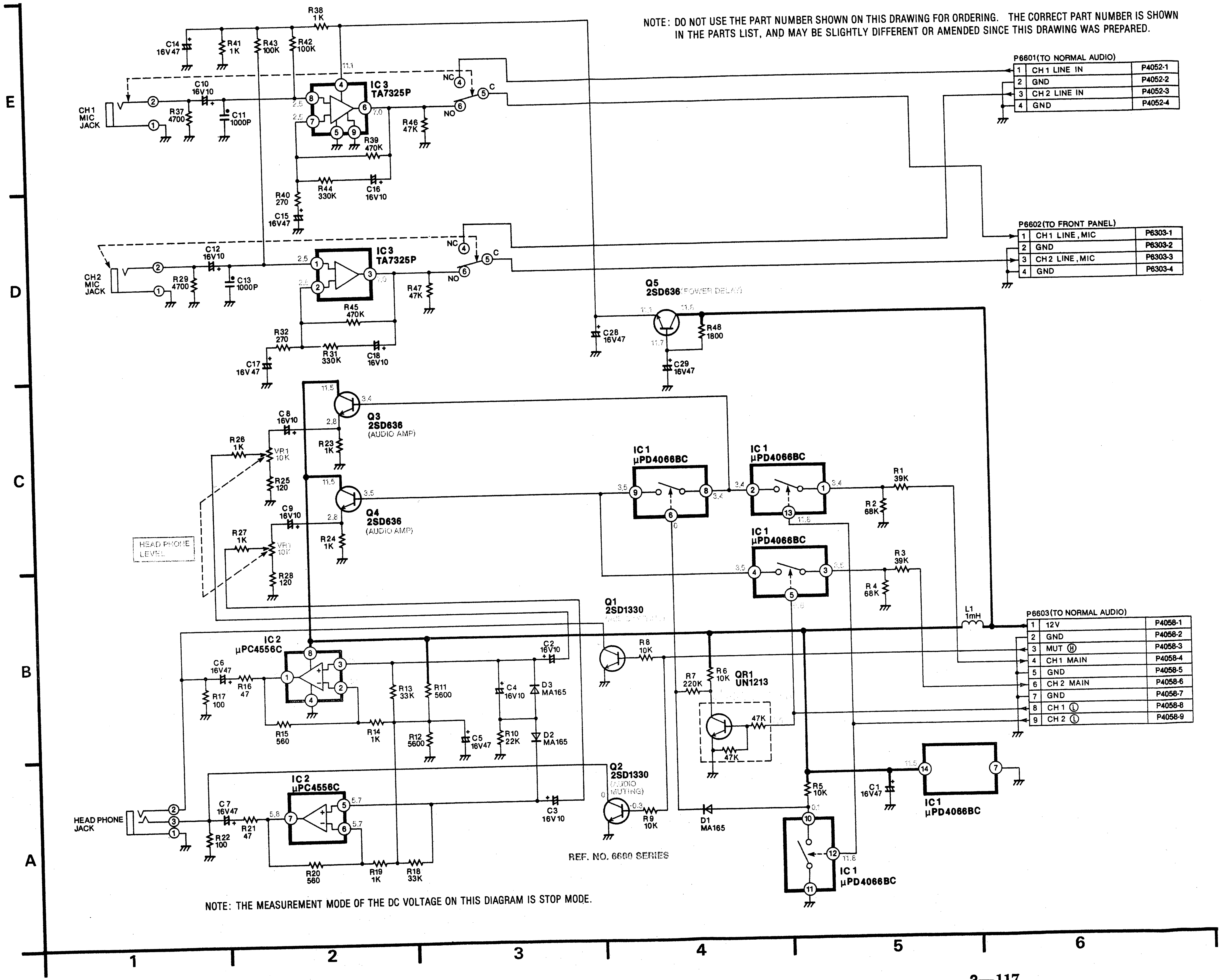

D
C
B
A
1
2
3
4
5
6
7
R1 3900
R2 100K
OR1 UN1213
R3 10K
R4 100K
OR2 UN1213
47K
47K
47K
47K
(TO REAR JACK (3)) P6301
P6421-1 CH1 J HD Ⓛ 1
P6421-2 CH2 J HD Ⓛ 2
C1 16V10
IC 1 μPD4066BC
14
7
P6308 (TO METER)
1 12V P6310-1
2 GND P6310-2
(TO NORMAL AUDIO) P6302
P4053-1 CH1 HD LINE IN 1
P4053-2 GND 2
P4053-3 CH2 HD LINE IN 3
P4053-4 GND 4
IC 1
IC1
μPD4066BC
IC 1
IC 1
6.0
C2 16V10
VR1 10K
CH1 HD LEVEL
CH1 HD AUDIO LEVEL
VR5 10K
C3 16V10
VR2 10K
CH2 HD LEVEL
CH2 HD AUDIO LEVEL
VR6 10K
C4 16V10
R5 10K
C5 16V10
R6 10K
P6304 (TO HD AUDIO)
1 CH1 HD AMP P4301-1
2 GND P4301-2
3 CH2 HD AMP P4301-3
4 GND P4301-4
(TO FRONT JACK) P6303
P6602-1 CH1 LINE,MIC 1
P6602-2 GND 2
P6602-3 CH2 LINE,MIC 3
P6602-4 GND 4
P6305 (TO NORMAL AUDIO)
1 CH1 LINE AMP P4005-1
2 GND P4005-2
3 CH2 LINE AMP P4005-3
4 GND P4005-4
5 12V P4005-5
6 GND P4005-6
(TO VIDEO) P6306
P3013-1 MANUAL OUT 1
P3013-2 GND 2
P3013-3 GND 3
P3013-4 MANUAL IN 4
R8 1200
R7 1000
VR9 503
VIDEO LEVEL
(TO SERVO) P6309
P2009-1 TRACKING VR ⊕ 1
P2009-2 TRACKING VR ⊖ 2
VR10 100K
TRACKING
REF. NO.6300 SERIES

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

FRONT JACK SCHEMATIC DIAGRAM

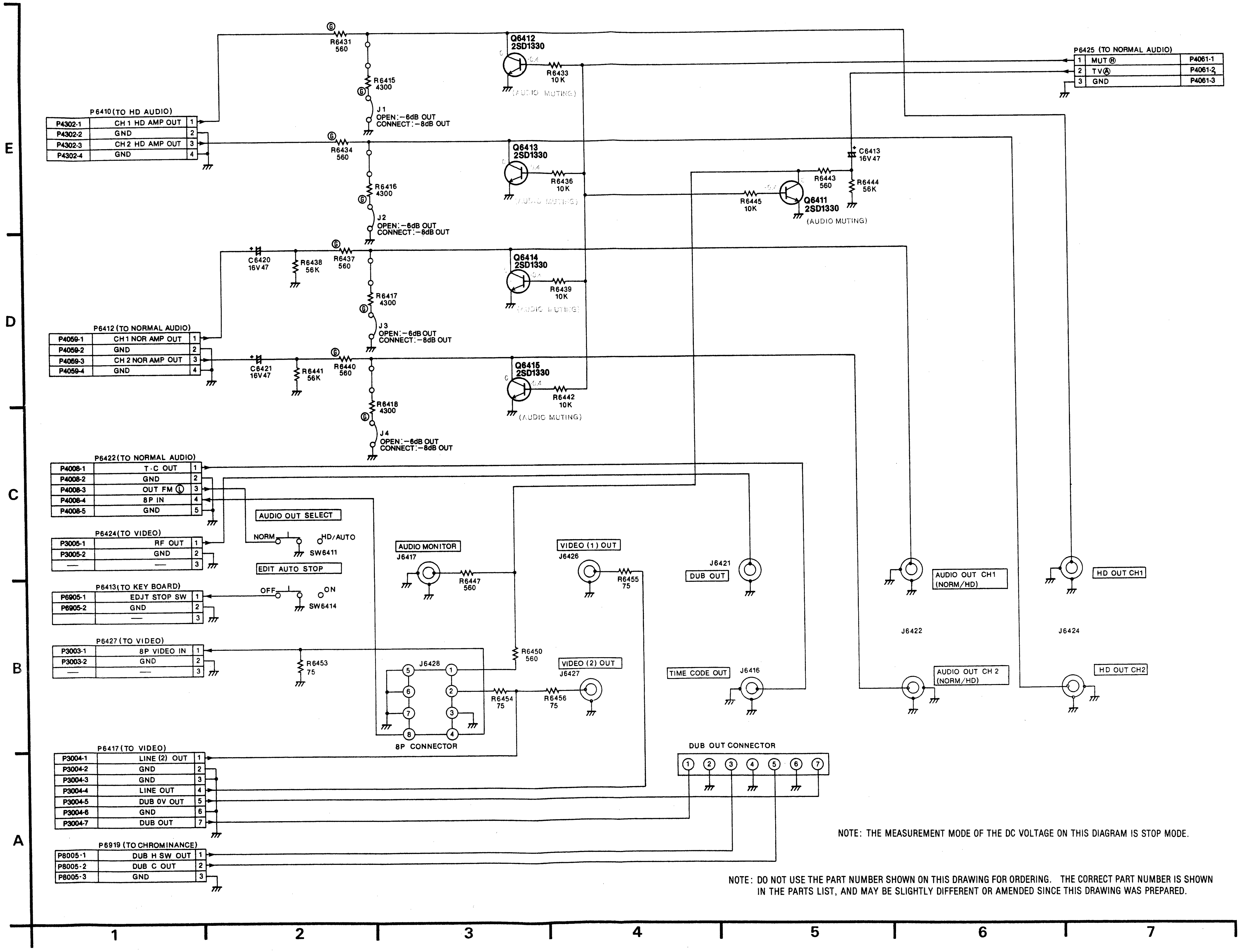
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.


CH1 MIC JACK
CH2 MIC JACK
HEAD PHONE JACK
HEAD PHONE LEVEL
IC 3 TA7325P
IC 2 µPC4556C
IC 1 µPD4066BC
Q1 2SD1330
Q2 2SD1330 (AUDIO MUTING)
Q3 2SD636 (AUDIO AMP)
Q4 2SD636 (AUDIO AMP)
Q5 2SD636 (POWER DELAY)
QR1 UN1213
D1 MA165
D2 MA165
D3 MA165
L1 1mH
R38 1K
R41 1K
R43 100K
R42 100K
C14 16V47
C10 16V10
C11 1000P
R37 4700
R46 47K
R39 470K
R44 330K
C16 16V10
R40 270
C15 16V47
C12 16V10
C13 1000P
R29 4700
R47 47K
R45 470K
R32 270
R31 330K
C18 16V10
C17 16V47
C28 16V47
R48 1800
C29 16V47
C8 16V10
R26 1K
VR1 10K
R25 120
R23 1K
C9 16V10
R27 1K
R28 120
R24 1K
R1 39K
R2 68K
R3 39K
R4 68K
R8 10K
R7 220K
R6 10K
47K
47K
C6 16V47
R17 100
R16 47
R15 560
R14 1K
R13 33K
R11 5600
R12 5600
C4 16V10
C5 16V47
R10 22K
C2 16V10
C7 16V47
R22 100
R21 47
R20 560
R19 1K
R18 33K
C3 16V10
R9 10K
R5 10K
C1 16V47
NC
NO
C
P6601(TO NORMAL AUDIO)
1 CH1 LINE IN P4052-1
2 GND P4052-2
3 CH2 LINE IN P4052-3
4 GND P4052-4
P6602(TO FRONT PANEL)
1 CH1 LINE, MIC P6303-1
2 GND P6303-2
3 CH2 LINE, MIC P6303-3
4 GND P6303-4
P6603(TO NORMAL AUDIO)
1 12V P4058-1
2 GND P4058-2
3 MUT Ⓗ P4058-3
4 CH1 MAIN P4058-4
5 GND P4058-5
6 CH 2 MAIN P4058-6
7 GND P4058-7
8 CH 1 Ⓛ P4058-8
9 CH 2 Ⓛ P4058-9
REF. NO. 6680 SERIES
E
D
C
B
A
1
2
3
4
5
6

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

REAR

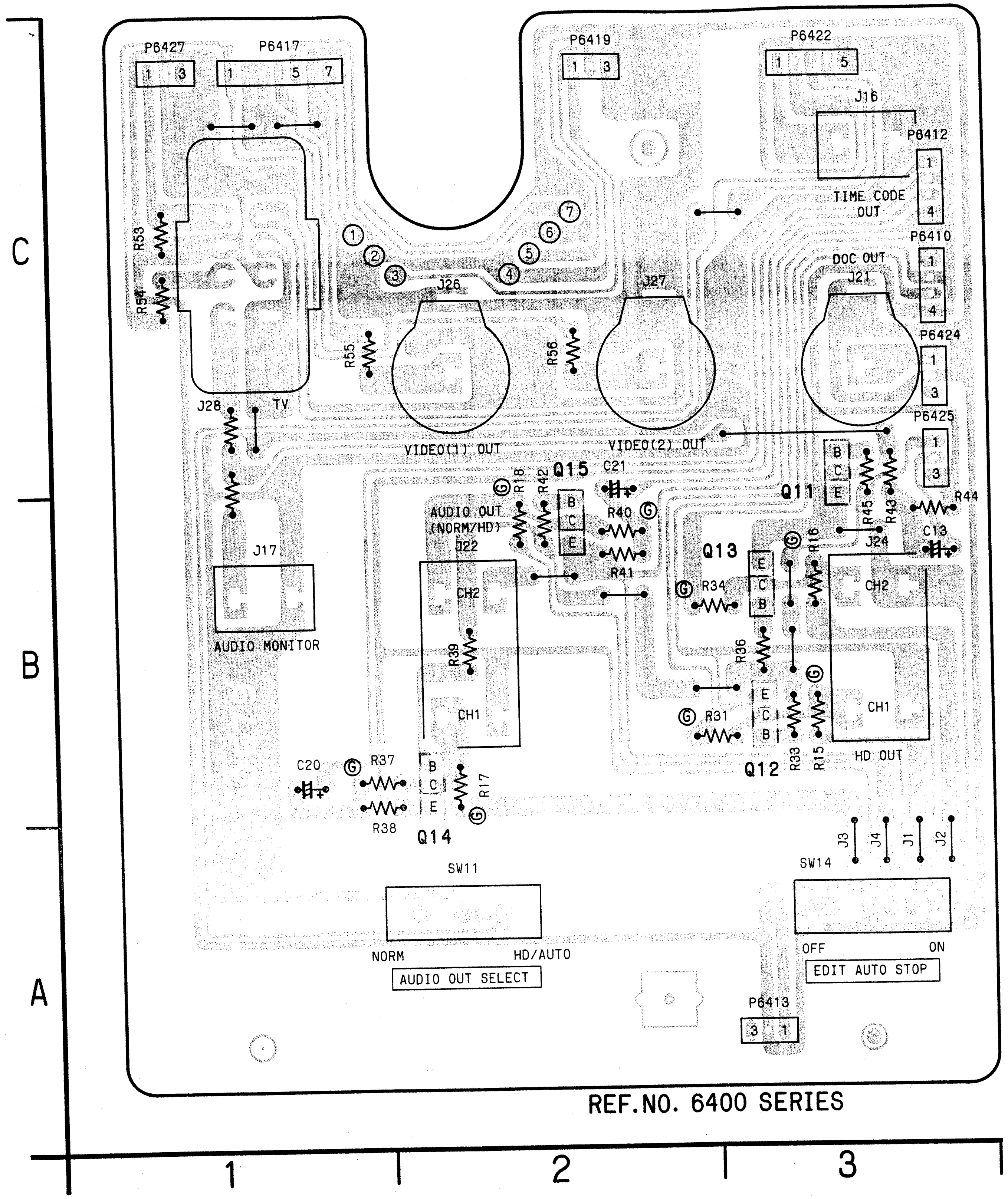
REAR JACK (2) SCHEMATIC DIAGRAM


P6410 (TO HD AUDIO)
P4302-1 CH 1 HD AMP OUT 1
P4302-2 GND 2
P4302-3 CH 2 HD AMP OUT 3
P4302-4 GND 4
R6431 560
R6415 4300
J1 OPEN: −6dB OUT CONNECT: −8dB OUT
R6434 560
R6416 4300
J2 OPEN: −6dB OUT CONNECT: −8dB OUT
C6420 16V47
R6438 56K
R6437 560
R6417 4300
J3 OPEN: −6dB OUT CONNECT: −8dB OUT
P6412 (TO NORMAL AUDIO)
P4059-1 CH1 NOR AMP OUT 1
P4059-2 GND 2
P4059-3 CH 2 NOR AMP OUT 3
P4059-4 GND 4
C6421 16V47
R6441 56K
R6440 560
R6418 4300
J4 OPEN: −6dB OUT CONNECT: −8dB OUT
Q6412 2SD1330
R6433 10K
(AUDIO MUTING)
Q6413 2SD1330
R6436 10K
(AUDIO MUTING)
Q6414 2SD1330
R6439 10K
(AUDIO MUTING)
Q6415 2SD1330
R6442 10K
(AUDIO MUTING)
P6425 (TO NORMAL AUDIO)
1 MUT Ⓗ P4061-1
2 TV Ⓐ P4061-2
3 GND P4061-3
C6413 16V47
R6443 560
R6444 56K
R6445 10K
Q6411 2SD1330
(AUDIO MUTING)
P6422 (TO NORMAL AUDIO)
P4008-1 T·C OUT 1
P4008-2 GND 2
P4008-3 OUT FM Ⓛ 3
P4008-4 8P IN 4
P4008-5 GND 5
AUDIO OUT SELECT
NORM
HD/AUTO
SW6411
P6424 (TO VIDEO)
P3005-1 RF OUT 1
P3005-2 GND 2
— — 3
EDIT AUTO STOP
OFF
ON
SW6414
P6413 (TO KEY BOARD)
P6905-1 EDJT STOP SW 1
P6905-2 GND 2
— 3
P6427 (TO VIDEO)
P3003-1 8P VIDEO IN 1
P3003-2 GND 2
— — 3
R6453 75
AUDIO MONITOR
J6417
R6447 560
VIDEO (1) OUT
J6426
R6455 75
J6428
8P CONNECTOR
R6450 560
VIDEO (2) OUT
J6427
R6454 75
R6456 75
J6421
DUB OUT
TIME CODE OUT
J6416
AUDIO OUT CH1 (NORM/HD)
AUDIO OUT CH 2 (NORM/HD)
J6422
HD OUT CH1
HD OUT CH2
J6424
P6417 (TO VIDEO)
P3004-1 LINE (2) OUT 1
P3004-2 GND 2
P3004-3 GND 3
P3004-4 LINE OUT 4
P3004-5 DUB 0V OUT 5
P3004-6 GND 6
P3004-7 DUB OUT 7
P6919 (TO CHROMINANCE)
P8005-1 DUB H SW OUT 1
P8005-2 DUB C OUT 2
P8005-3 GND 3
DUB OUT CONNECTOR
① ② ③ ④ ⑤ ⑥ ⑦
E
D
C
B
A
1
2
3
4
5
6
7

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

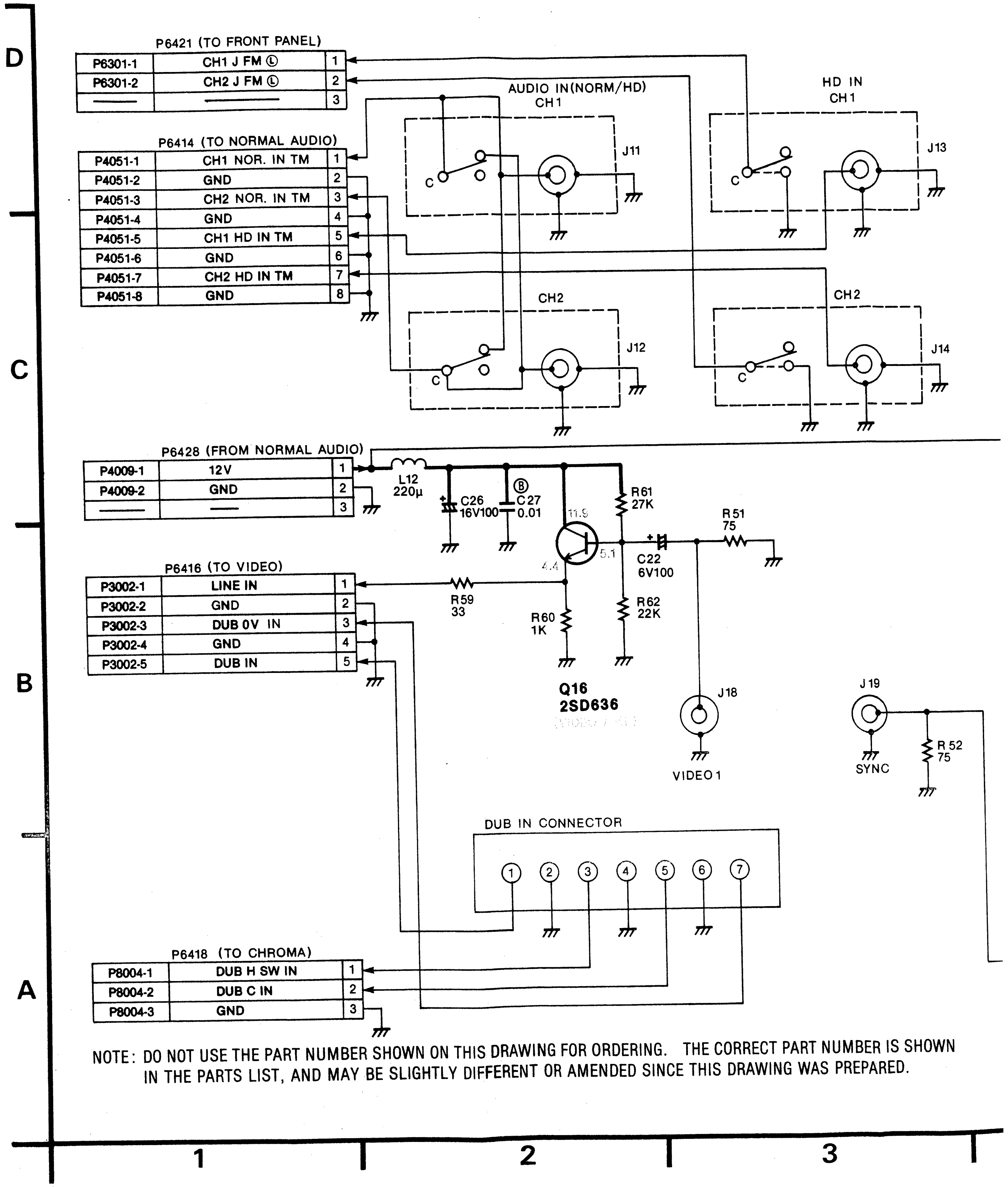
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

REAR JACK (2) C.B.A. (VEP00F79A)

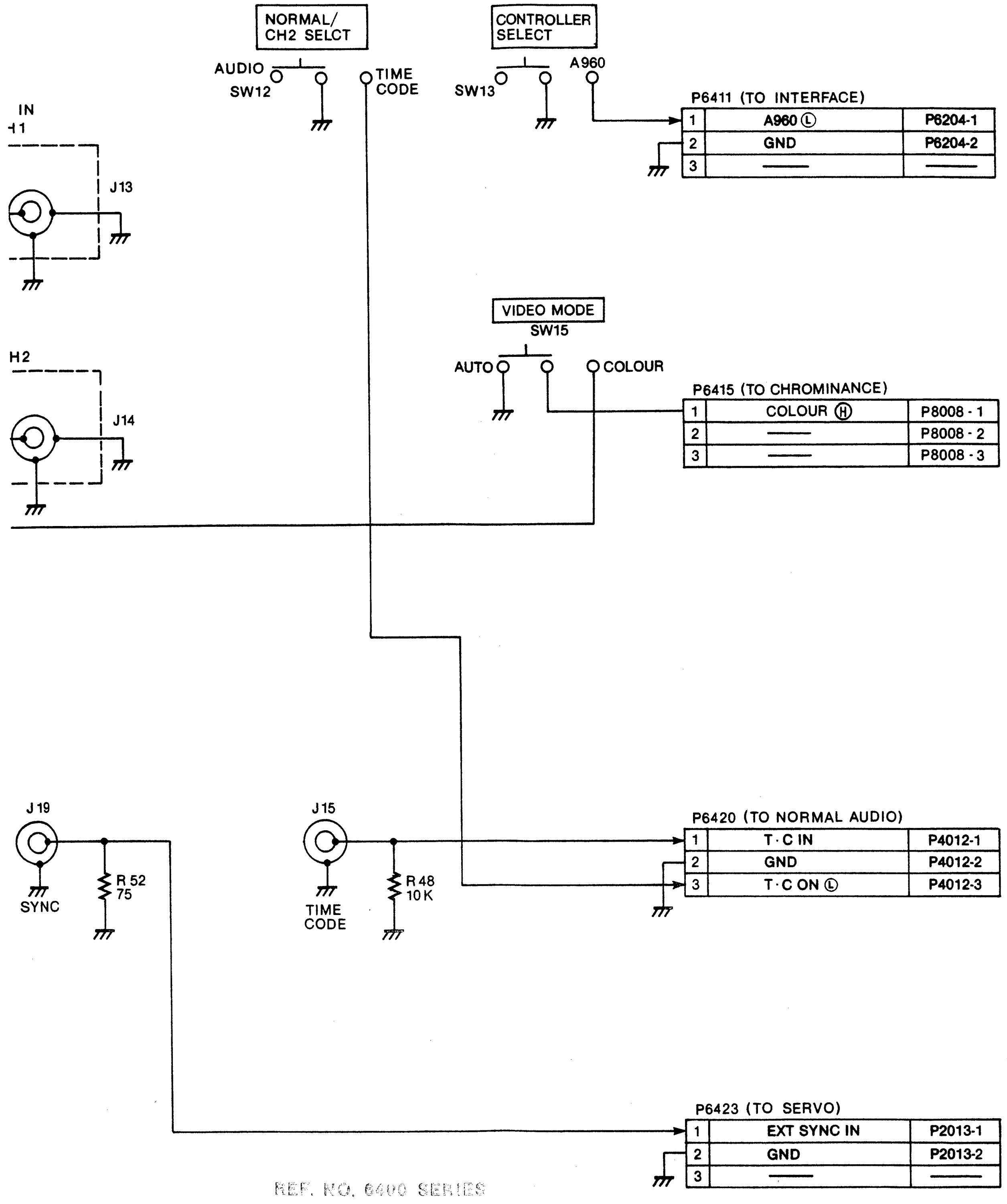

P6427
P6417
P6419
P6422
J16
P6412
TIME CODE OUT
P6410
DOC OUT
J21
J26
J27
P6424
P6425
J28
TV
R53
R54
R55
R56
VIDEO(1) OUT
VIDEO(2) OUT
Q15
C21
R18
R42
R40
R41
AUDIO OUT (NORM/HD)
J22
Q11
R45
R43
R44
C13
J24
Q13
R34
R16
R36
R39
J17
AUDIO MONITOR
CH2
CH1
R31
R33
R15
Q12
HD OUT
C20
R37
R38
R17
Q14
SW11
SW14
J3
J4
J1
J2
NORM
HD/AUTO
AUDIO OUT SELECT
OFF
ON
EDIT AUTO STOP
P6413
C
B
A
1
2
3

REF.NO. 6400 SERIES

REAR JACK (3) SCHEMATIC DIAGRAM


D
C
B
A
P6421 (TO FRONT PANEL)
P6301-1 CH1 J FM Ⓛ 1
P6301-2 CH2 J FM Ⓛ 2
3
AUDIO IN(NORM/HD) CH1
HD IN CH1
J11
J13
P6414 (TO NORMAL AUDIO)
P4051-1 CH1 NOR. IN TM 1
P4051-2 GND 2
P4051-3 CH2 NOR. IN TM 3
P4051-4 GND 4
P4051-5 CH1 HD IN TM 5
P4051-6 GND 6
P4051-7 CH2 HD IN TM 7
P4051-8 GND 8
CH2
J12
J14
P6428 (FROM NORMAL AUDIO)
P4009-1 12V 1
P4009-2 GND 2
3
L12 220µ
C26 16V100
C27 0.01
R61 27K
R51 75
C22 6V100
11.9
5.1
4.4
P6416 (TO VIDEO)
P3002-1 LINE IN 1
P3002-2 GND 2
P3002-3 DUB 0V IN 3
P3002-4 GND 4
P3002-5 DUB IN 5
R59 33
R60 1K
R62 22K
Q16 2SD636
J18
VIDEO1
J19
SYNC
R52 75
DUB IN CONNECTOR
① ② ③ ④ ⑤ ⑥ ⑦
P6418 (TO CHROMA)
P8004-1 DUB H SW IN 1
P8004-2 DUB C IN 2
P8004-3 GND 3
1
2
3

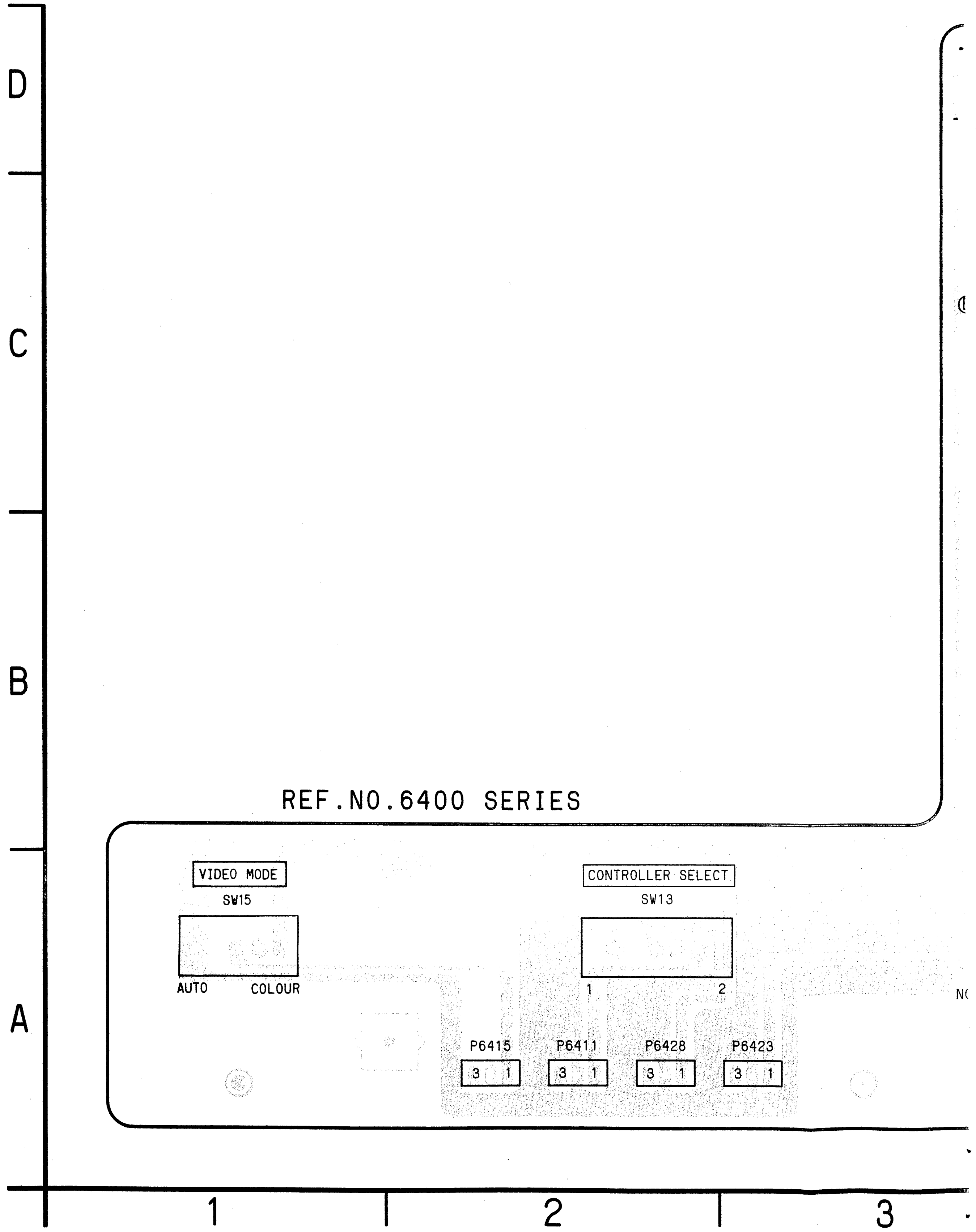
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.


NORMAL/
CH2 SELCT
AUDIO
SW12
TIME
CODE
CONTROLLER
SELECT
SW13
A960
P6411 (TO INTERFACE)
1 A960 Ⓛ P6204-1
2 GND P6204-2
3 —— ——
IN
J13
H2
J14
VIDEO MODE
SW15
AUTO
COLOUR
P6415 (TO CHROMINANCE)
1 COLOUR Ⓗ P8008 - 1
2 —— P8008 - 2
3 —— P8008 - 3
J19
SYNC
R52
75
J15
TIME
CODE
R48
10K
P6420 (TO NORMAL AUDIO)
1 T·C IN P4012-1
2 GND P4012-2
3 T·C ON Ⓛ P4012-3
P6423 (TO SERVO)
1 EXT SYNC IN P2013-1
2 GND P2013-2
3 —— ——
REF. NO. 6400 SERIES

BER IS SHOWN
EPARED.

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

REAR JACK (3) C.B.A. (VEP00G67B)


D
C
B
A
REF.NO.6400 SERIES
VIDEO MODE
SW15
AUTO
COLOUR
CONTROLLER SELECT
SW13
1
2
P6415
3 1
P6411
3 1
P6428
3 1
P6423
3 1
1
2
3

P6204-1
P6204-2

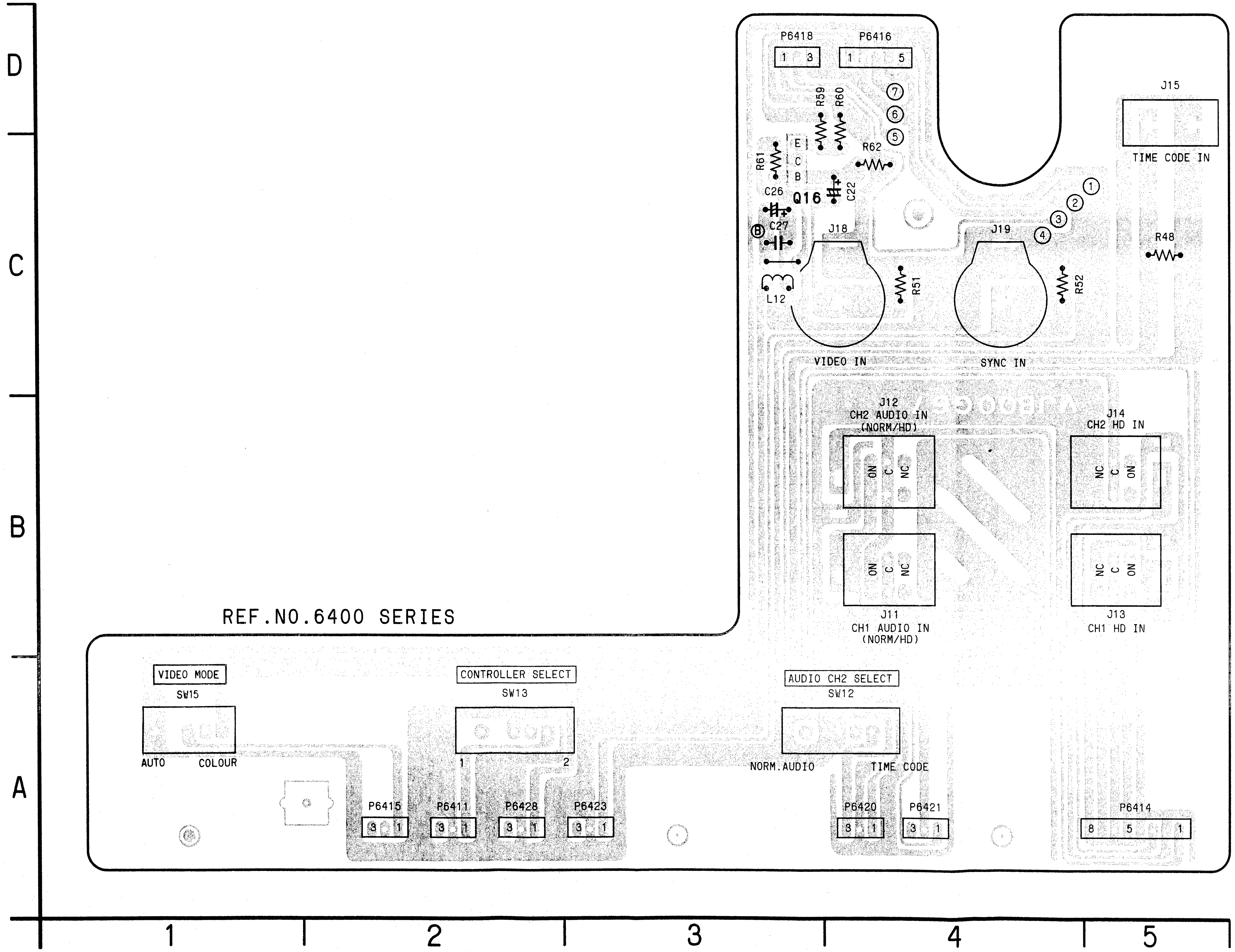
P8008 - 1
P8008 - 2
P8008 - 3

P4012-1
P4012-2
P4012-3

P2013-1
P2013-2

STOP MODE.

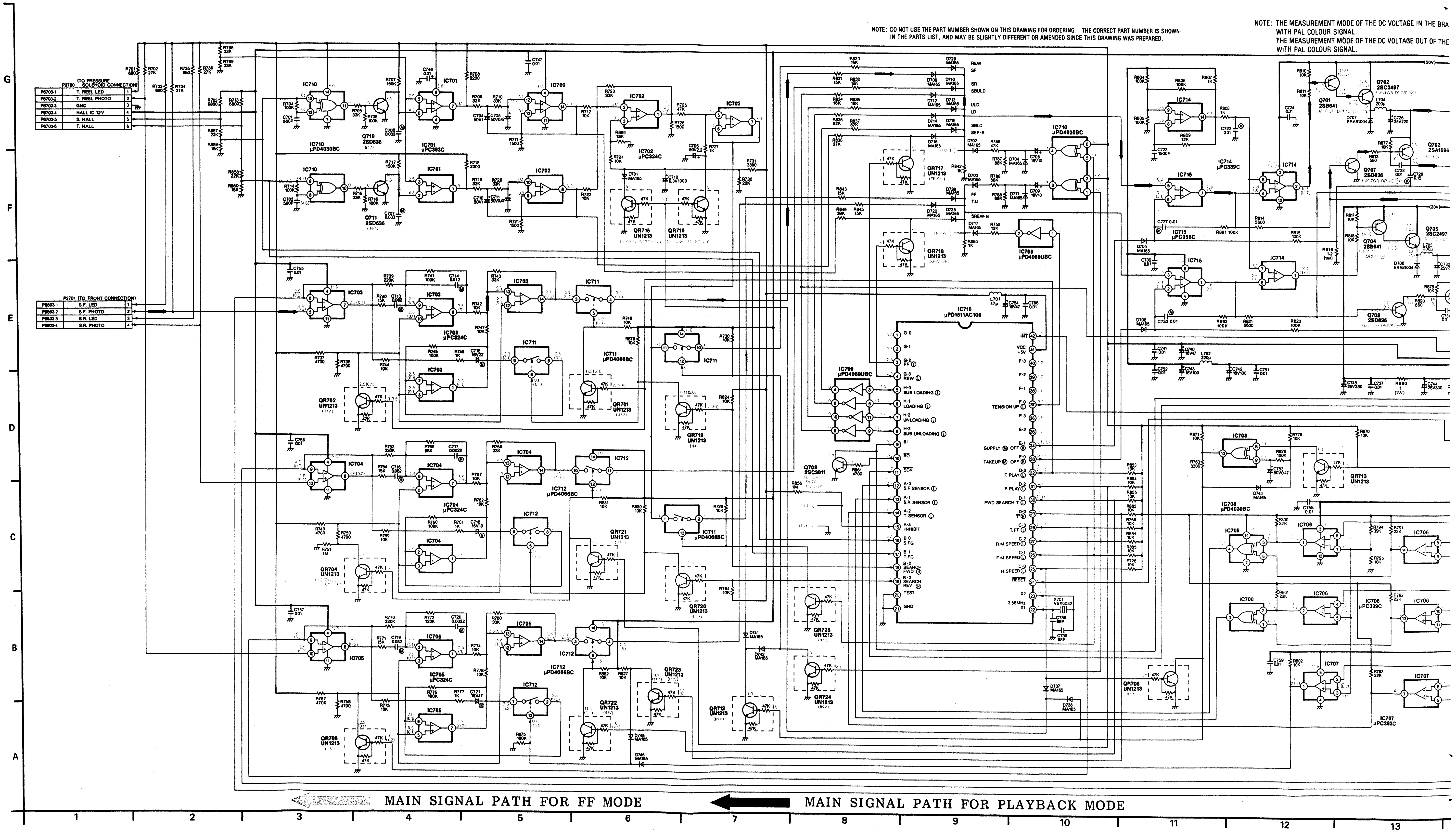
REAR JACK (3) C.B.A. (VEP00G67B)


D
C
B
A
1
2
3
4
5
P6418
P6416
R59
R60
R61
R62
E
C
B
C26
Q16
C22
C27
Ⓑ
L12
J18
J19
R51
R52
①
②
③
④
⑤
⑥
⑦
J15
TIME CODE IN
R48
VIDEO IN
SYNC IN
J12
CH2 AUDIO IN
(NORM/HD)
J14
CH2 HD IN
NO
C
NC
J11
CH1 AUDIO IN
(NORM/HD)
J13
CH1 HD IN
REF.NO.6400 SERIES
VIDEO MODE
SW15
AUTO
COLOUR
CONTROLLER SELECT
SW13
1
2
AUDIO CH2 SELECT
SW12
NORM.AUDIO
TIME CODE
P6415
P6411
P6428
P6423
P6420
P6421
P6414
3
1
8
5

REEL SERVO SCHEMATIC DIAGRAM

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRA
WITH PAL COLOUR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE
WITH PAL COLOUR SIGNAL.

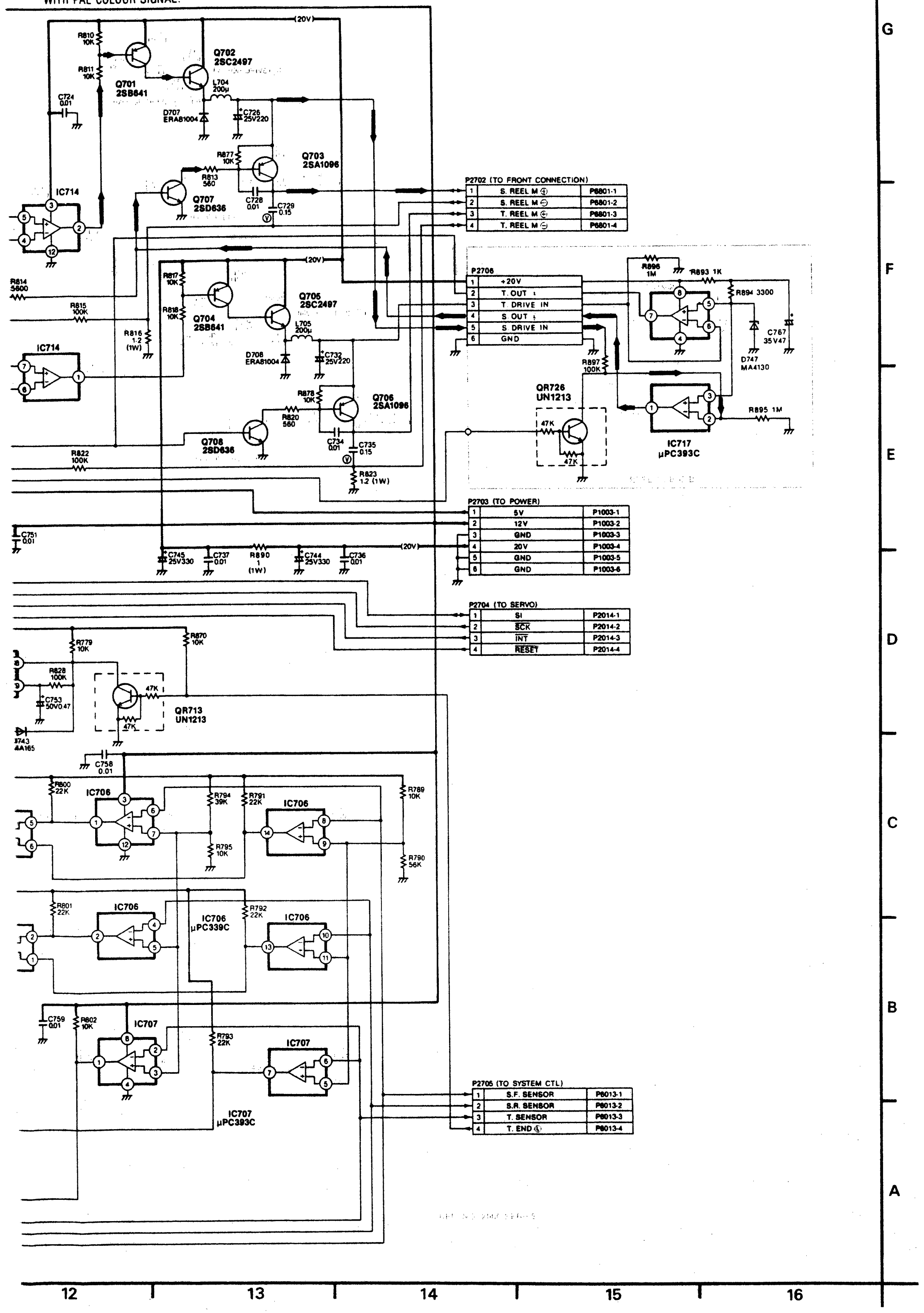

P2700 (TO PRESSURE SOLENOID CONNECTION)
P6703-1 T. REEL LED 1
P6703-2 T. REEL PHOTO 2
P6703-3 GND 3
P6703-4 HALL IC 12V 4
P6703-5 S. HALL 5
P6703-6 T. HALL 6
P2701 (TO FRONT CONNECTION)
P6803-1 S.F. LED 1
P6803-2 S.F. PHOTO 2
P6803-3 S.R. LED 3
P6803-4 S.R. PHOTO 4
IC710 μPD4030BC
IC701 μPC393C
IC702 μPC324C
Q710 2SD636
Q711 2SD636
QR715 UN1213
QR716 UN1213
IC703 μPC324C
IC704 μPC324C
IC705 μPC324C
IC711 μPD4066BC
IC712 μPD4066BC
QR701 UN1213
QR702 UN1213
QR704 UN1213
QR706 UN1213
QR719 UN1213
QR720 UN1213
QR721 UN1213
QR722 UN1213
QR723 UN1213
QR712 UN1213
IC709 μPD4069UBC
IC716 μPD1511AC106
Q709 2SC3811
QR717 UN1213
QR718 UN1213
QR724 UN1213
QR725 UN1213
X701 VSX0082 3.58MHz
REW
SF
SR
SBULD
ULD
LD
SBLD
SEF-B
FF
T.U
SREW-B
G-0
G-1
G-2 FF
G-3 REW
H-0 SUB LOADING
H-1 LOADING
H-2 UNLOADING
H-3 SUB UNLOADING
SI
SO
SCK
A-0 S.F. SENSOR
A-1 S.R. SENSOR
A-2 T. SENSOR
A-3 INHIBIT
B-0 S.FG
B-1 T.FG
B-2 SEARCH FWD
B-3 SEARCH REV
TEST
GND
INT
VCC +5V
TENSION UP
SUPPLY OFF
TAKEUP OFF
F. PLAY
R. PLAY
FWD SEARCH T
T.FF
R.M.SPEED
F.M.SPEED
H.SPEED
RESET
X2
X1
IC714 μPC339C
IC715 μPC358C
IC708 μPD4030BC
IC706 μPC339C
IC707 μPC393C
Q701 2SB641
Q702 2SC2497
Q703 2SA1096
Q704 2SB641
Q705 2SC2497
Q707 2SD636
Q708 2SD636
QR713 UN1213
QR706 UN1213
(20V)
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13

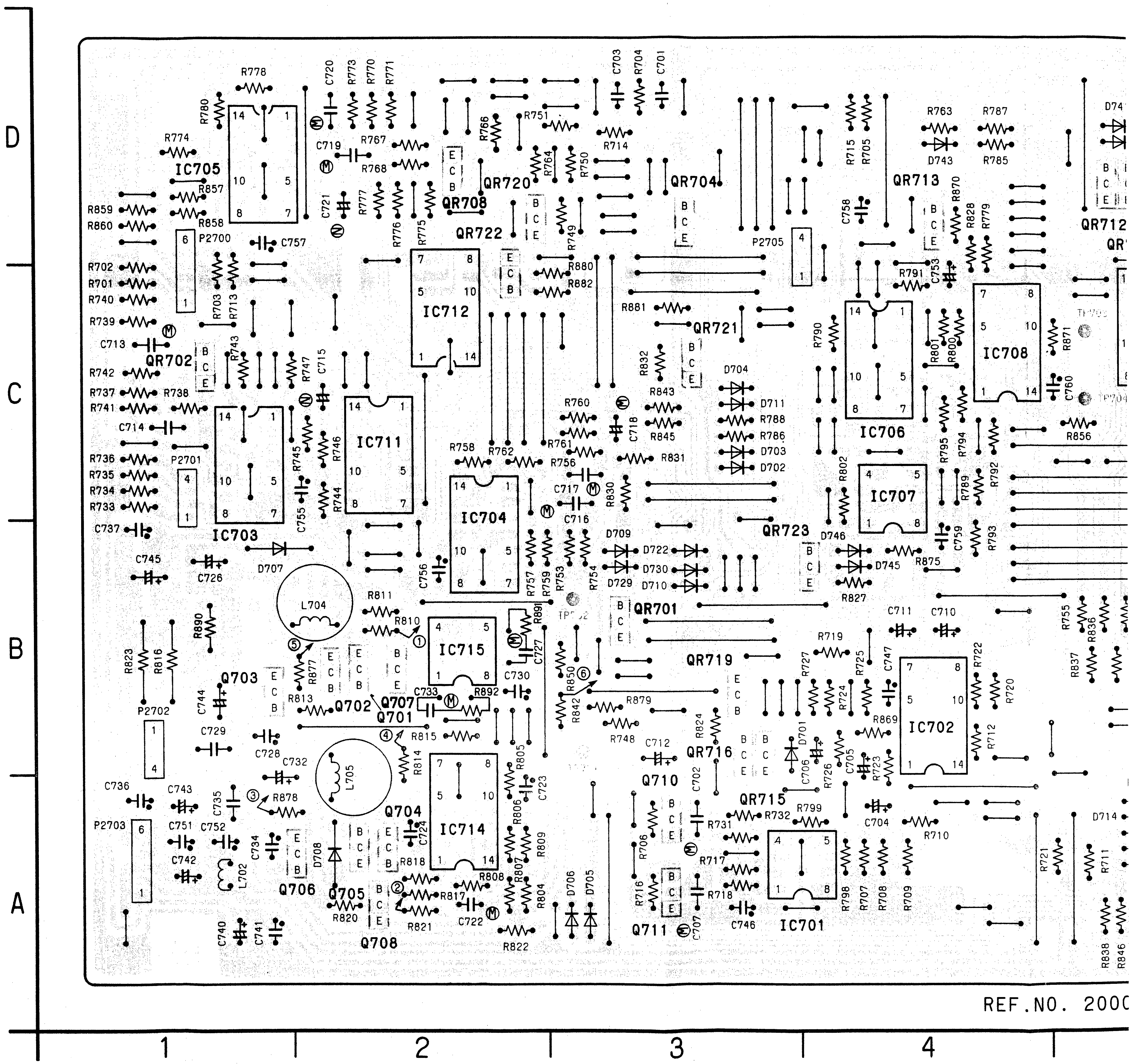
MAIN SIGNAL PATH FOR FF MODE

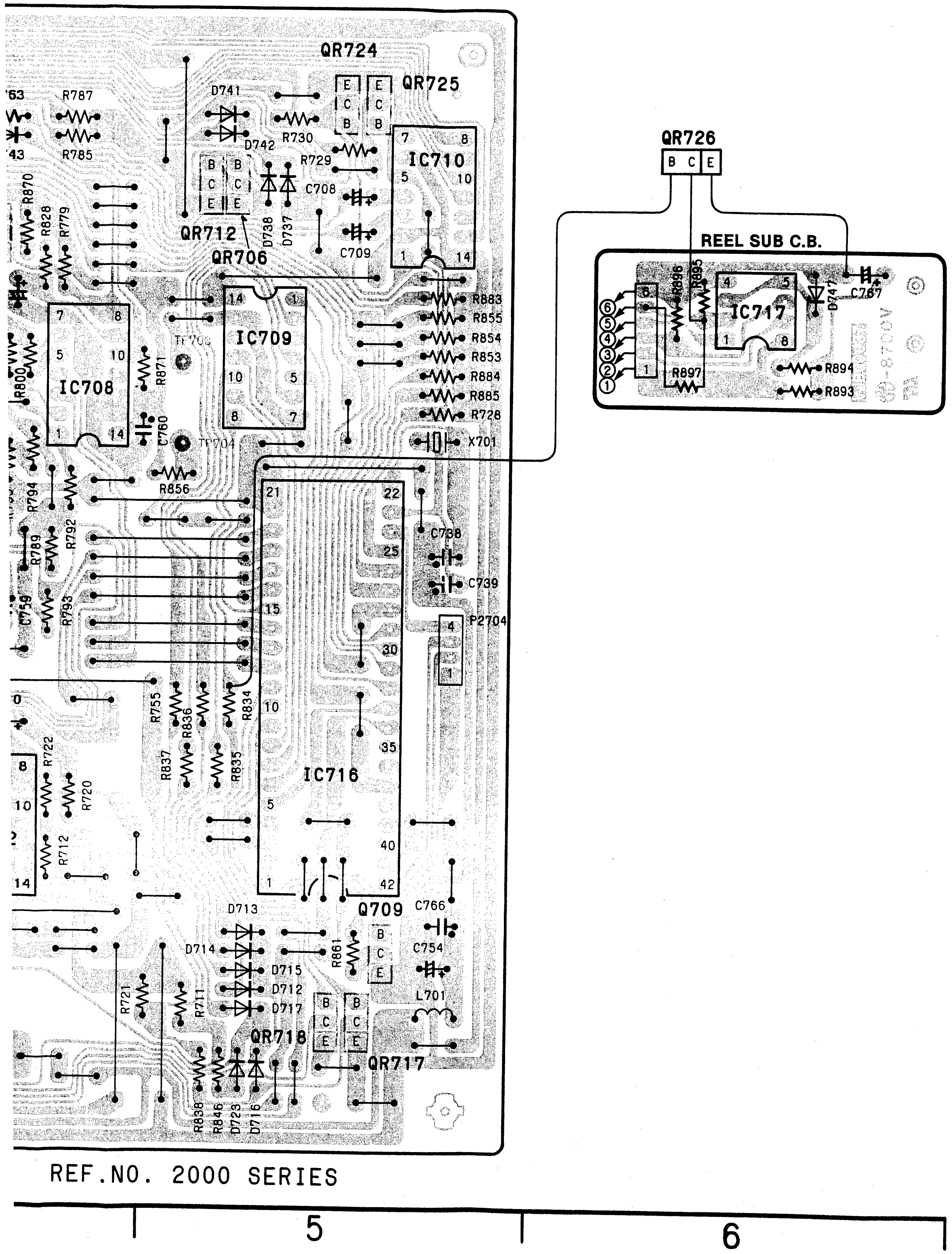
MAIN SIGNAL PATH FOR PLAYBACK MODE

REEL SERVO C.B.A. (VEP02224B)

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ON THIS DIAGRAM IS STOP MODE WITH PAL COLOUR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL.


Q701 2SB641
Q702 2SC2497
Q703 2SA1096
Q704 2SB641
Q705 2SC2497
Q706 2SA1096
Q707 2SD636
Q708 2SD636
IC714
IC706 μPC339C
IC707 μPC393C
IC717 μPC393C
QR713 UN1213
QR726 UN1213
P2702 (TO FRONT CONNECTION)
1 S. REEL M ⊕ P6801-1
2 S. REEL M ⊖ P6801-2
3 T. REEL M ⊕ P6801-3
4 T. REEL M ⊖ P6801-4
P2706
1 +20V
2 T. OUT
3 T. DRIVE IN
4 S. OUT
5 S. DRIVE IN
6 GND
P2703 (TO POWER)
1 5V P1003-1
2 12V P1003-2
3 GND P1003-3
4 20V P1003-4
5 GND P1003-5
6 GND P1003-6
P2704 (TO SERVO)
1 SI P2014-1
2 SCK P2014-2
3 INT P2014-3
4 RESET P2014-4
P2705 (TO SYSTEM CTL)
1 S.F. SENSOR P6013-1
2 S.R. SENSOR P6013-2
3 T. SENSOR P6013-3
4 T. END P6013-4
G
F
E
D
C
B
A
12
13
14
15
16

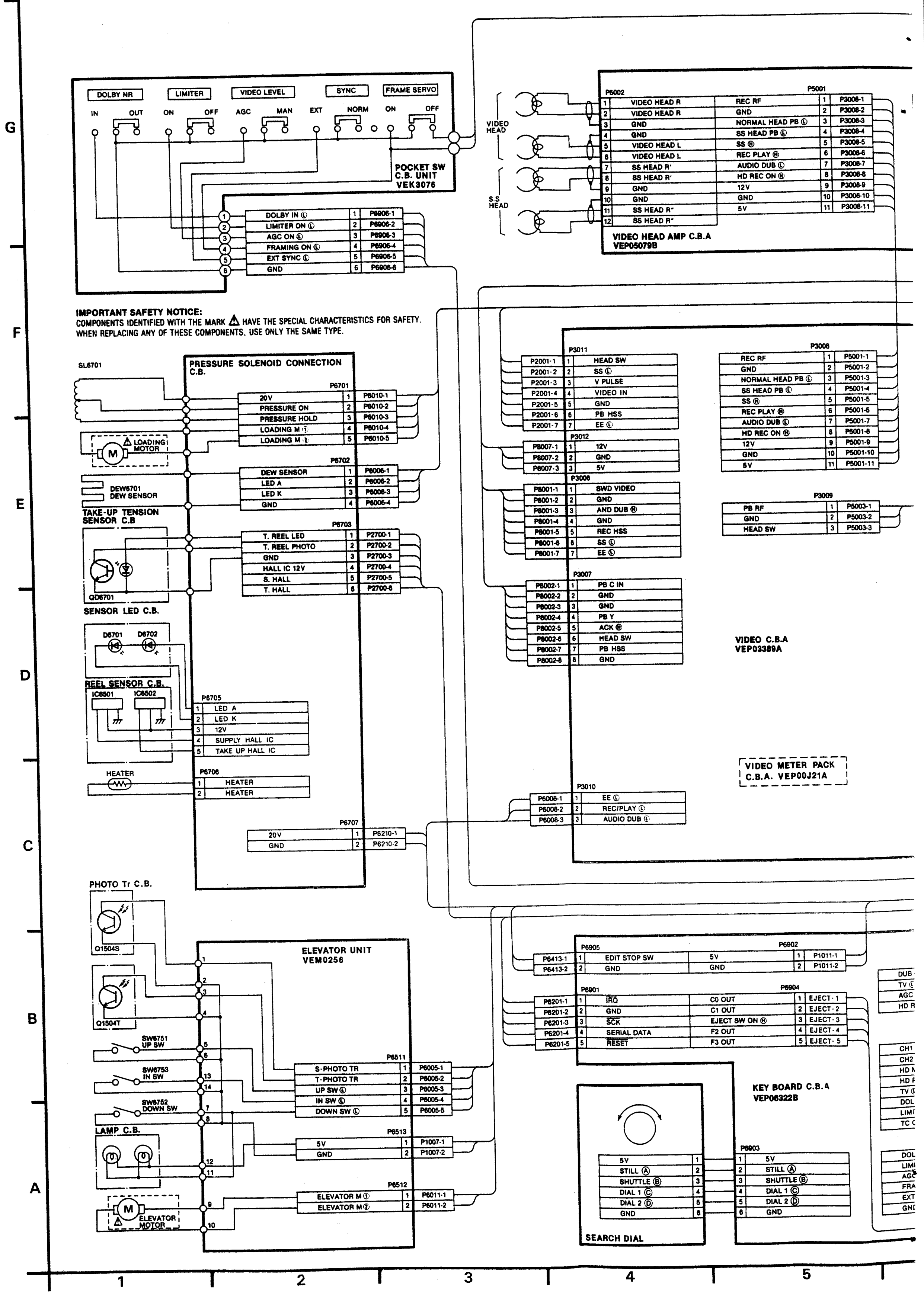

IC701
IC702
IC703
IC704
IC705
IC706
IC707
IC708
IC711
IC712
IC714
IC715
P2700
P2701
P2702
P2703
P2705
L704
L705
REF.NO. 200C
D
C
B
A
1
2
3
4


QR724
QR725
QR726
B C E
REEL SUB C.B.
QR712
QR706
IC710
IC709
IC708
IC717
IC716
QR718
QR717
Q709
D741
D742
R787
R785
R729
R730
C708
C709
R883
R855
R854
R853
R884
R885
R728
X701
R856
C738
C739
P2704
C766
C754
L701
D713
D714
D715
D712
D717
R861
R897
R894
R893
C767
D747
REF.NO. 2000 SERIES
5
6

Reel Servo C.B.A.	
Transistor	
Q2701	B-2
Q2702	B-2
Q2703	B-1
Q2704	A-2
Q2705	A-2
Q2706	A-2
Q2707	B-2
Q2708	A-2
Q2709	A-5
Q2710	A-3
Q2711	A-3
Transistor & Resistor	
QR2701	B-3
QR2702	C-1
QR2704	D-3
QR2706	D-5
QR2708	D-2
QR2712	D-5
QR2713	D-4
QR2715	B-3
QR2716	B-3
QR2717	A-5
QR2718	A-5
QR2719	B-3
QR2720	D-2
QR2721	C-3
QR2722	C-2
QR2723	B-4
QR2724	D-5
QR2725	D-5
QR2726	D-6
Integrated Circuit	
IC2701	A-3
IC2702	B-4
IC2703	C-1
IC2704	B-2
IC2705	D-1
IC2706	C-4
IC2707	C-4
IC2708	C-4
IC2709	C-5
IC2710	D-5
IC2711	C-2
IC2712	C-2
IC2714	A-2
IC2715	B-2
IC2716	B-5
IC2717	D-6
Test Point	
TP2701	B-3
TP2702	B-3
TP2703	C-5
TP2704	C-5

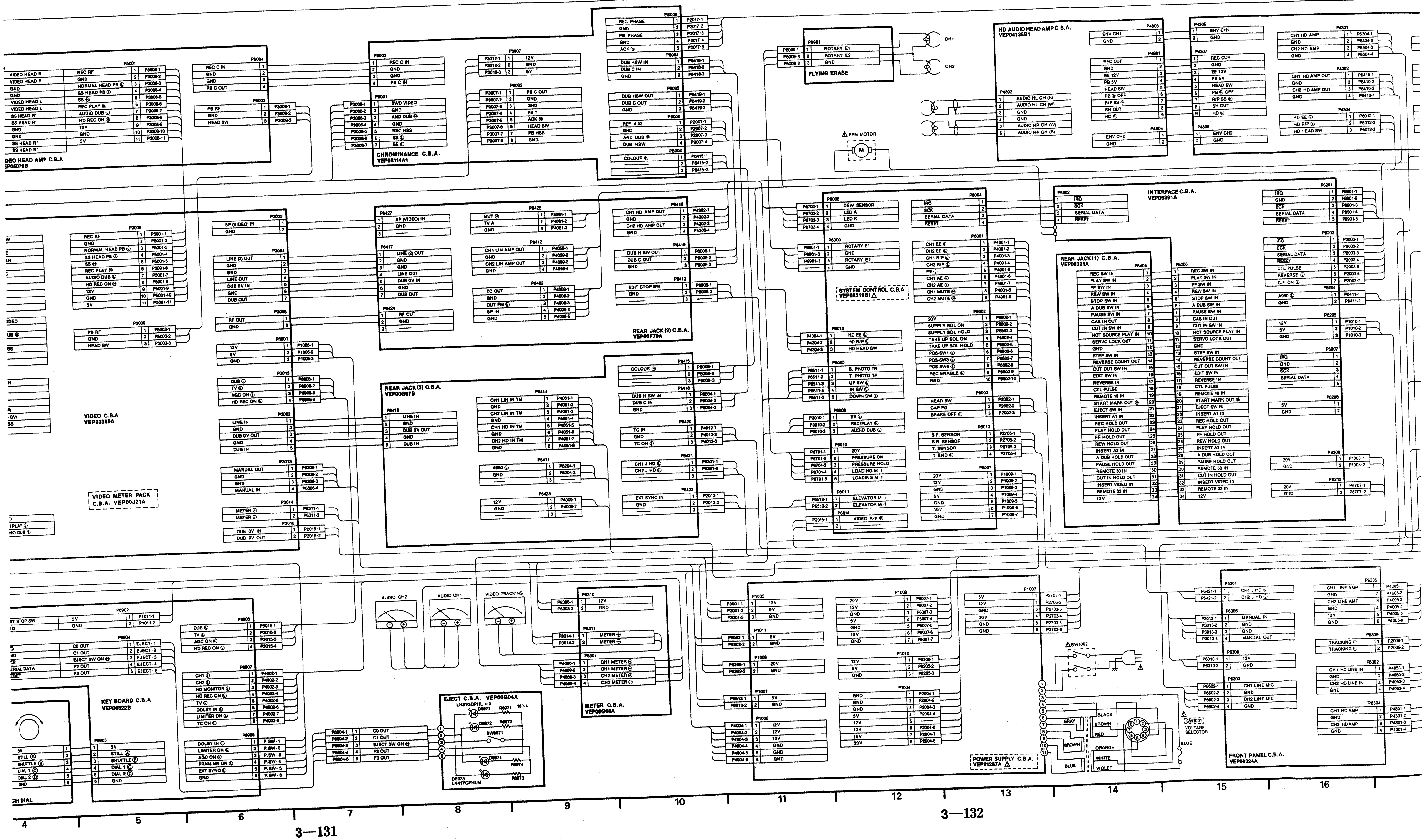
ADDRESS INFORMATION

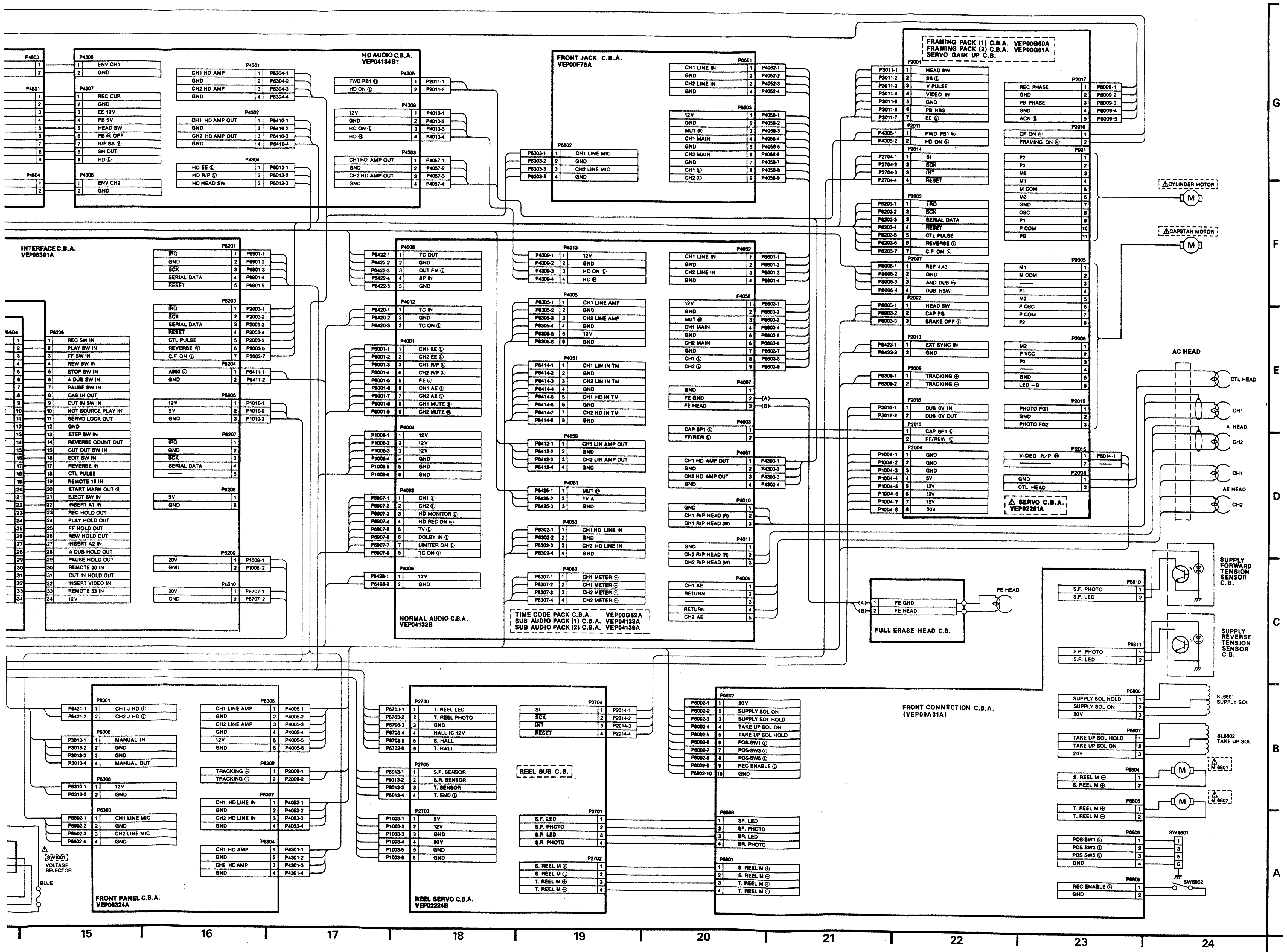
INTERCONNECTION SCHEMATIC DIAGRAM


G
F
E
D
C
B
A
1
2
3
4
5
DOLBY NR
LIMITER
VIDEO LEVEL
SYNC
FRAME SERVO
POCKET SW C.B. UNIT VEK3076
VIDEO HEAD
S.S HEAD
VIDEO HEAD AMP C.B.A VEP05079B
SL6701
PRESSURE SOLENOID CONNECTION C.B.
LOADING MOTOR
DEW6701 DEW SENSOR
TAKE-UP TENSION SENSOR C.B
SENSOR LED C.B.
REEL SENSOR C.B.
HEATER
VIDEO C.B.A VEP03389A
VIDEO METER PACK C.B.A. VEP00J21A
PHOTO Tr C.B.
ELEVATOR UNIT VEM0256
SW6751 UP SW
SW6753 IN SW
SW6752 DOWN SW
LAMP C.B.
ELEVATOR MOTOR
KEY BOARD C.B.A VEP06322B
SEARCH DIAL

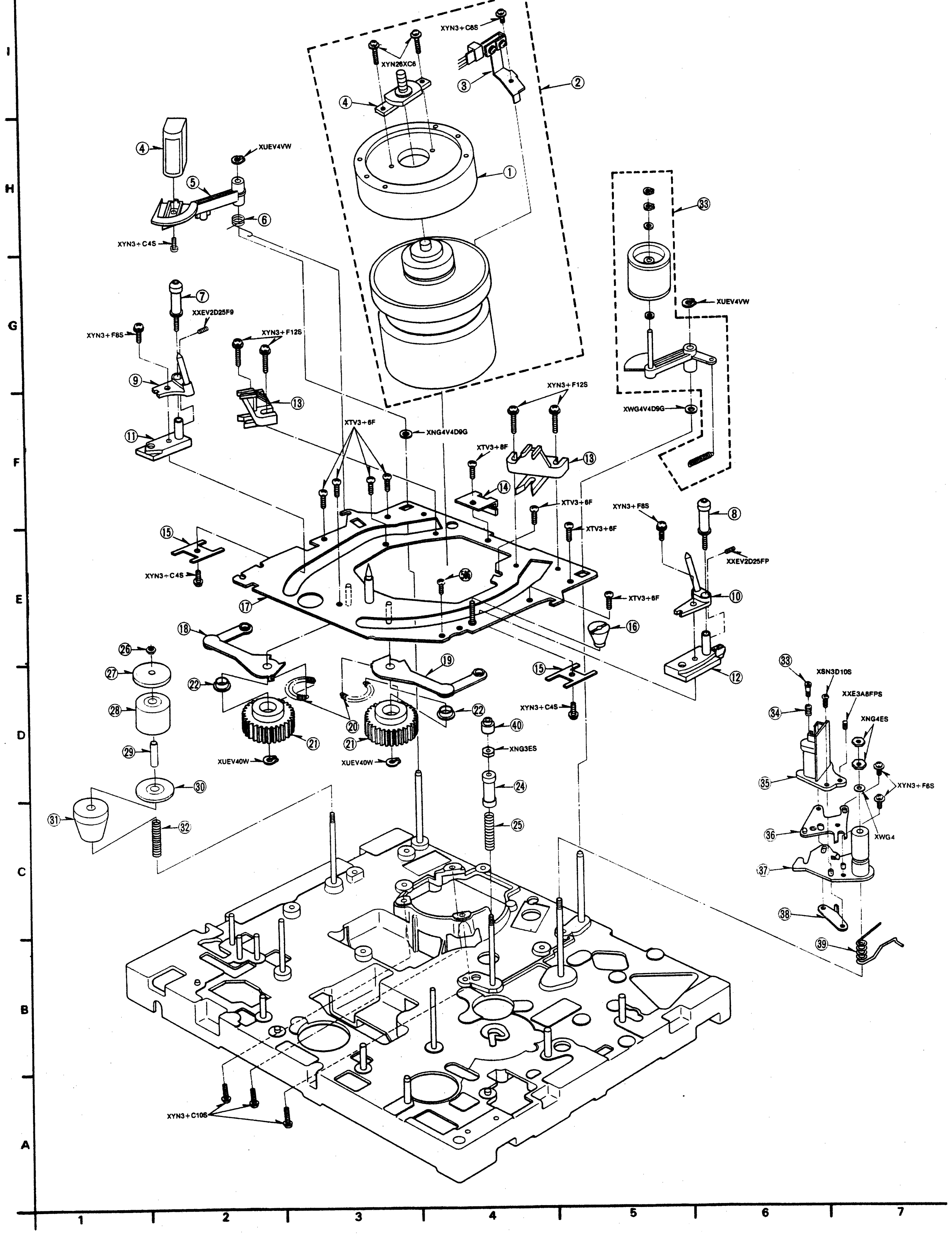
IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.

AM

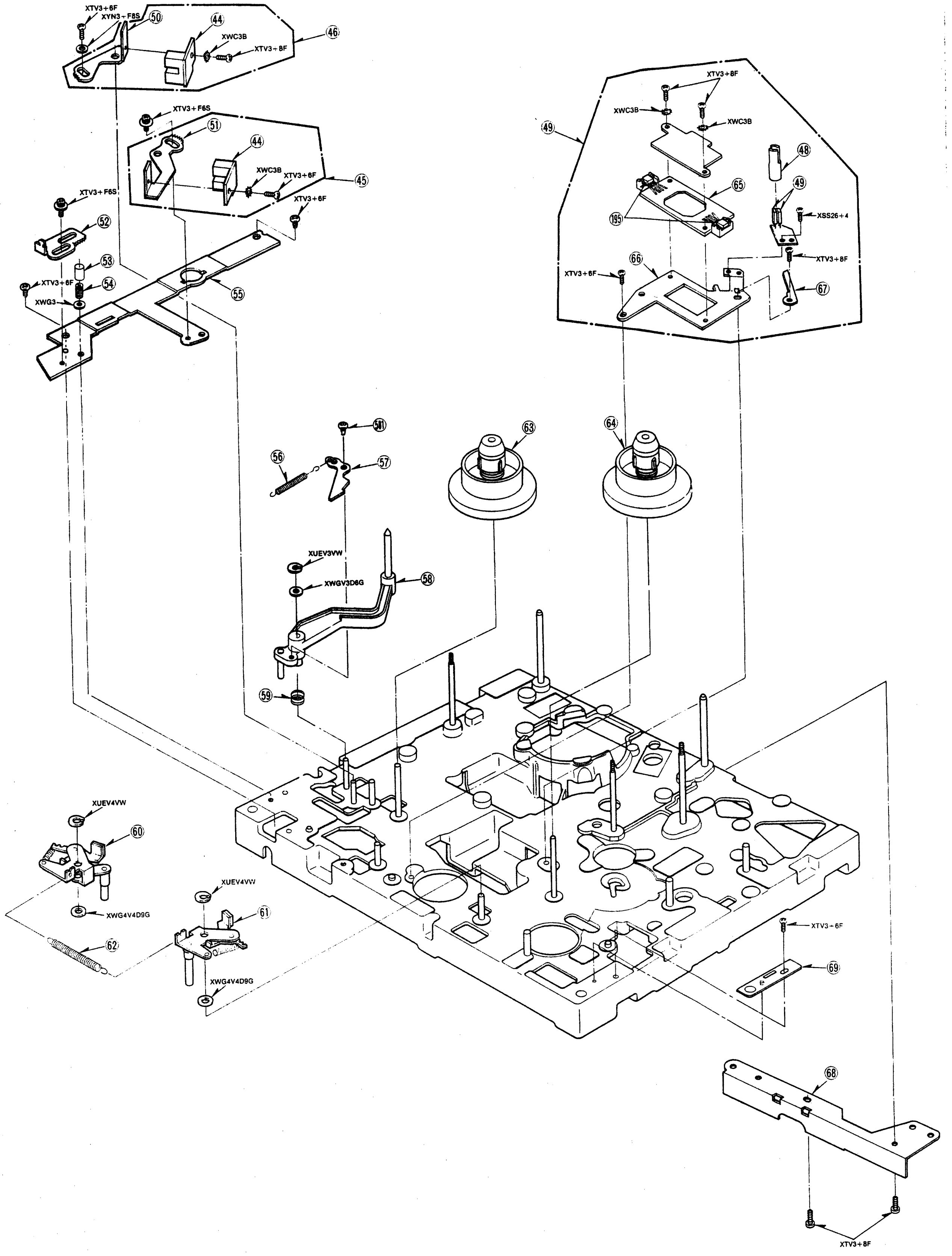

VIDEO HEAD AMP C.B.A VEP06079B
CHROMINANCE C.B.A. VEP08114A1
FLYING ERASE
CH1
CH2
FAN MOTOR
HD AUDIO HEAD AMP C.B.A. VEP04135B1
INTERFACE C.B.A. VEP06391A
VIDEO C.B.A. VEP03389A
VIDEO METER PACK C.B.A. VEP00J21A
REAR JACK (2) C.B.A. VEP00F79A
REAR JACK (3) C.B.A. VEP00G67B
SYSTEM CONTROL C.B.A. VEP06319B1
REAR JACK (1) C.B.A. VEP06321A
KEY BOARD C.B.A VEP06322B
AUDIO CH2
AUDIO CH1
VIDEO TRACKING
EJECT C.B.A. VEP00G04A
METER C.B.A. VEP00G68A
SW1002
SW1001 VOLTAGE SELECTOR
BLACK
BROWN
RED
ORANGE
WHITE
VIOLET
GRAY
BLUE
POWER SUPPLY C.B.A. VEP01267A
FRONT PANEL C.B.A. VEP06324A
4
5
6
7
8
9
10
11
12
13
14
15
16


HD AUDIO C.B.A.
VEP04134B1
FRONT JACK C.B.A.
VEP00F76A
FRAMING PACK (1) C.B.A. VEP00G60A
FRAMING PACK (2) C.B.A. VEP00G61A
SERVO GAIN UP C.B.
INTERFACE C.B.A.
VEP06391A
NORMAL AUDIO C.B.A.
VEP04132B
TIME CODE PACK C.B.A. VEP00G62A
SUB AUDIO PACK (1) C.B.A. VEP04133A
SUB AUDIO PACK (2) C.B.A. VEP04139A
SERVO C.B.A.
VEP02261A
CYLINDER MOTOR
CAPSTAN MOTOR
AC HEAD
CTL HEAD
CH1
A HEAD
CH2
CH1
AE HEAD
CH2
FE HEAD
FULL ERASE HEAD C.B.
SUPPLY FORWARD TENSION SENSOR C.B.
SUPPLY REVERSE TENSION SENSOR C.B.
FRONT CONNECTION C.B.A.
(VEP00A31A)
SL6801
SUPPLY SOL
SL6802
TAKE UP SOL
M6801
M6802
SW6801
SW6802
REEL SUB C.B.
FRONT PANEL C.B.A.
VEP06324A
REEL SERVO C.B.A.
VEP02224B
SW1001
VOLTAGE SELECTOR
BLUE
G
F
E
D
C
B
A
15
16
17
18
19
20
21
22
23
24

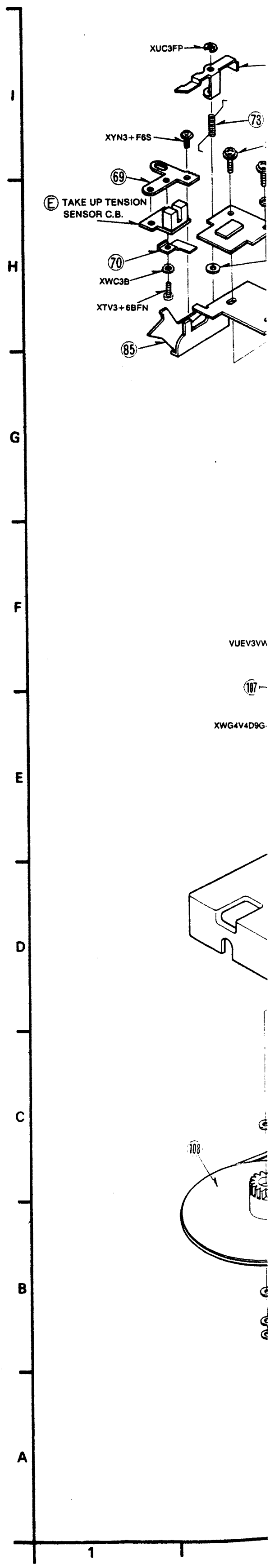
EXPLODED VIEWS ❶ *Transport Section*


I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
XYN3+C8S
XYN26XC6
④
③
②
①
④
XUEV4VW
⑤
⑥
XYN3+C4S
⑦
XXEV2D25F9
XYN3+F8S
XYN3+F12S
⑨
⑬
⑪
㉝
XUEV4VW
XWG4V4D9G
XNG4V4D9G
XTV3+6F
XYN3+F12S
⑬
XTV3+6F
⑭
XTV3+6F
XTV3+6F
XYN3+F8S
⑧
XXEV2D25FP
⑮
XYN3+C4S
(506)
⑰
XTV3+6F
⑩
⑯
⑱
⑲
⑮
⑫
㉖
㉗
㉒
XYN3+C4S
⑳
㉒
㊵
㉘
㉑
㉑
XNG3ES
㉙
XUEV40W
XUEV40W
㉔
㉚
㉕
㉛
㉜
㉝
XSN3D10S
XXE3A8FPS
㉞
XNG4ES
㉟
XYN3+F6S
㊱
XWG4
㊲
㊳
㊴
XYN3+C10S

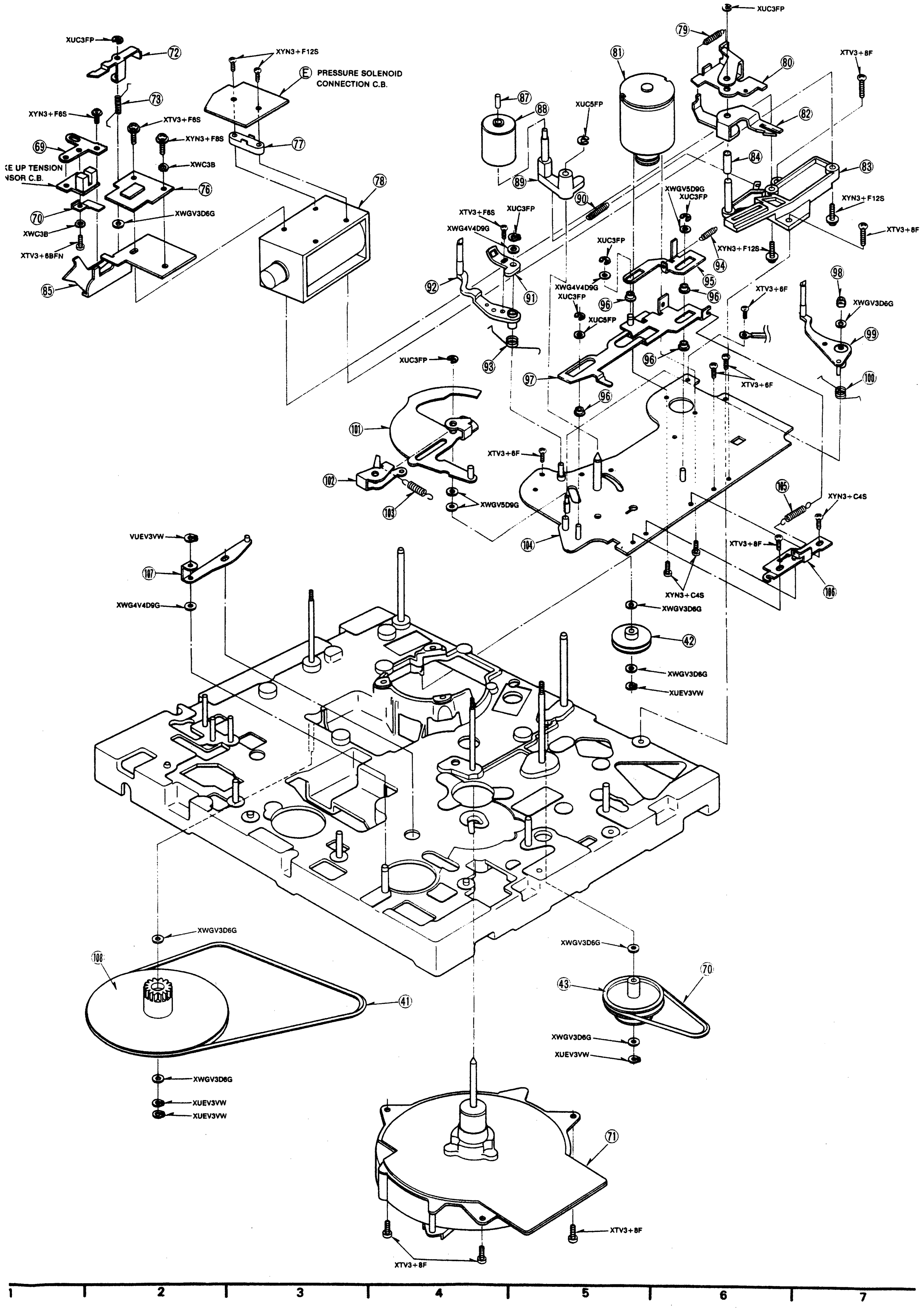
❷ *Moving Mechanism Section-(1)*


XTV3+6F
XYN3+F8S
㊿
㊹
XWC3B
XTV3+8F
㊻
XTV3+F6S
(51)
㊹
XWC3B
XTV3+6F
㊺
XTV3+F6S
XTV3+6F
(52)
(53)
XTV3+6F
(54)
XWG3
(55)
㊾
XTV3+8F
XWC3B
XWC3B
㊽
(65)
㊾
(195)
XSS26+4
(66)
XTV3+6F
XTV3+8F
(67)
(501)
(56)
(57)
(63)
(64)
XUEV3VW
XWGV3D6G
(58)
(59)
XUEV4VW
(60)
XWG4V4D9G
XUEV4VW
(61)
(62)
XWG4V4D9G
XTV3+6F
(69)
(68)
XTV3+8F

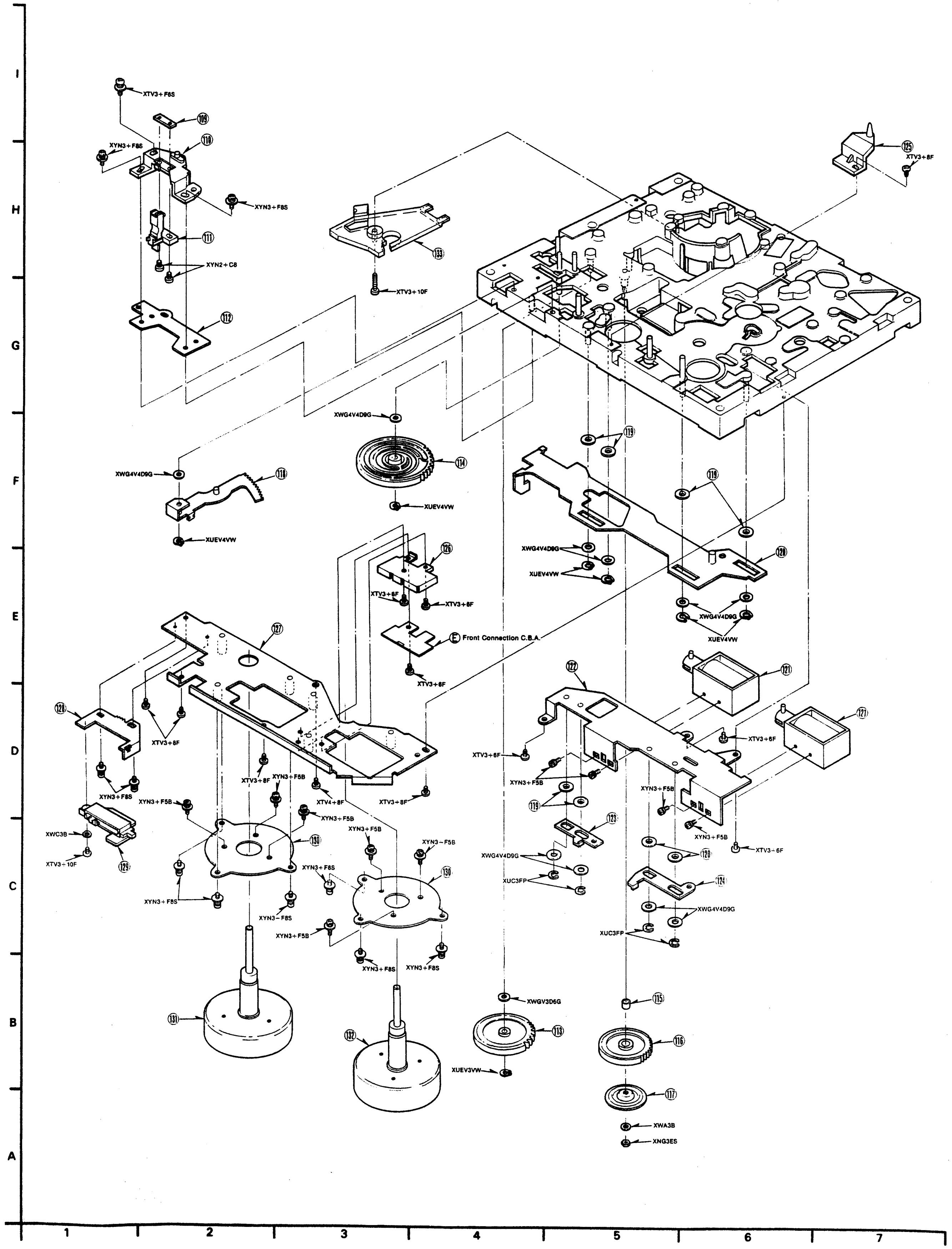
❸ *Chassis Pa*


I
H
G
F
E
D
C
B
A
1
XUC3FP
(73)
XYN3+F6S
(69)
Ⓔ TAKE UP TENSION SENSOR C.B.
(70)
XWC3B
XTV3+6BFN
(85)
VUEV3VW
(107)
XWG4V4D9G
(108)

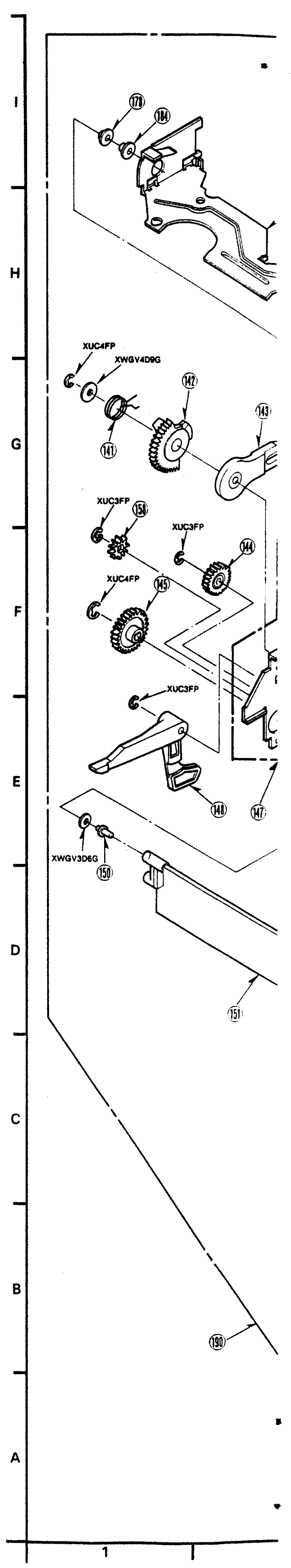
Chassis Parts Section


XUC3FP
(72)
XYN3+F12S
Ⓔ PRESSURE SOLENOID CONNECTION C.B.
(73)
XYN3+F6S
XTV3+F6S
XYN3+F8S
(69)
XWC3B
(77)
KE UP TENSION
NSOR C.B.
(76)
(78)
(70)
XWGV3D6G
XWC3B
XTV3+6BFN
(85)
(87)
(88)
XUC5FP
(81)
(79)
(80)
(82)
XTV3+8F
(84)
(83)
(89)
(90)
XWGV5D9G
XUC3FP
XYN3+F12S
XTV3+F6S
XUC3FP
XWG4V4D9G
XTV3+8F
(92)
(91)
XUC3FP
(95)
(94)
XWG4V4D9G
XUC3FP
(96)
XUC5FP
(98)
XTV3+6F
XWGV3D6G
(99)
(93)
XUC3FP
(97)
XTV3+6F
(100)
(101)
XTV3+6F
(102)
(103)
XWGV5D9G
(104)
(105)
XYN3+C4S
XTV3+8F
(106)
XYN3+C4S
VUEV3VW
(107)
XWG4V4D9G
XWGV3D6G
(42)
XWGV3D6G
XUEV3VW
XWGV3D6G
(108)
(41)
XWGV3D6G
(43)
(70)
XWGV3D6G
XUEV3VW
XWGV3D6G
XUEV3VW
XUEV3VW
(71)
XTV3+8F
XTV3+8F
1
2
3
4
5
6
7

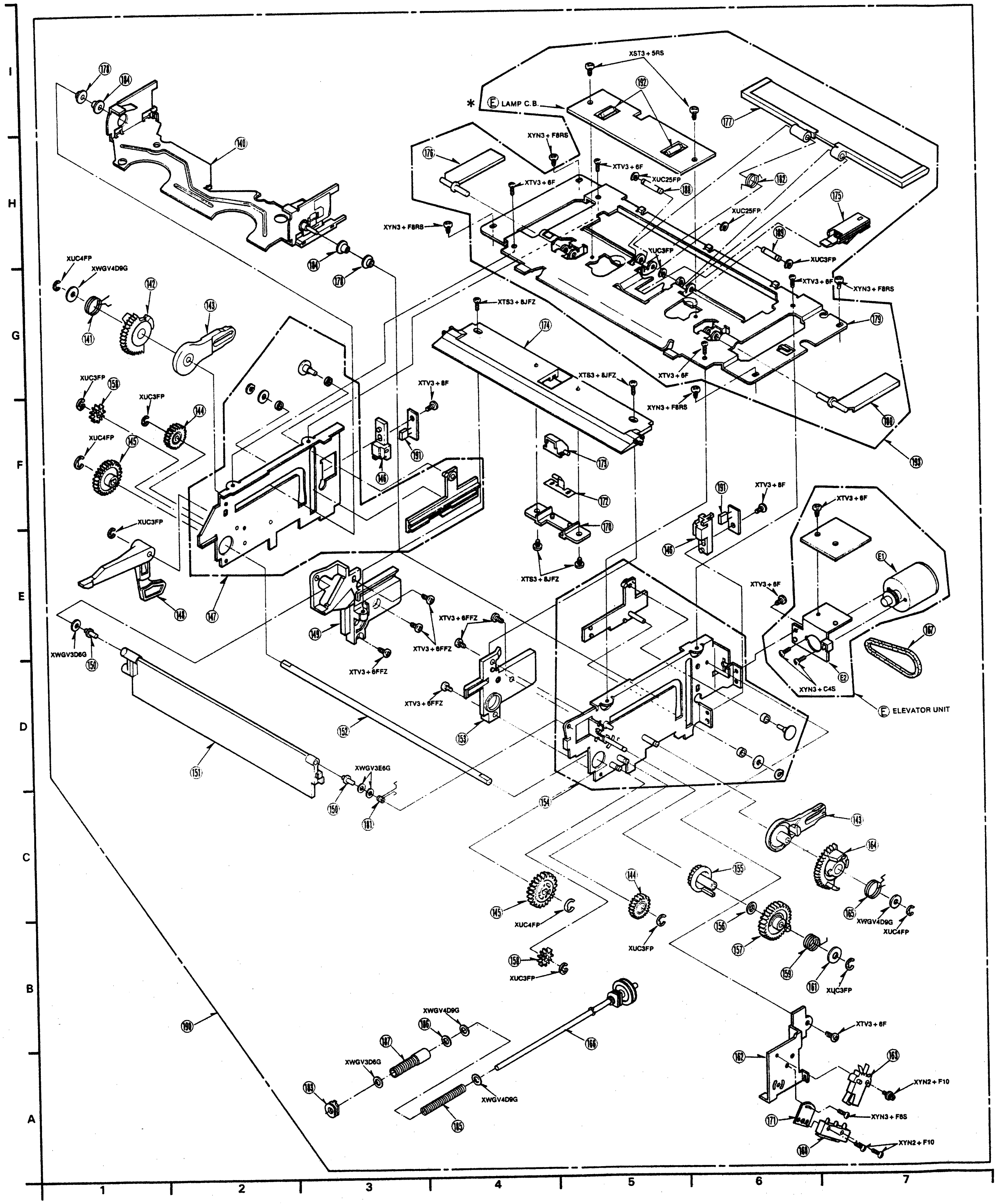
④ Moving Mechanism Section-(2)


I
H
G
F
E
D
C
B
A
XTV3+F6S
(109)
XYN3+F8S
(110)
XYN3+F8S
(111)
XYN2+C8
(112)
(133)
XTV3+10F
(125)
XTV3+8F
XWG4V4D9G
(114)
XWG4V4D9G
(118)
XUEV4VW
XUEV4VW
(119)
(119)
(120)
XWG4V4D9G
XUEV4VW
XWG4V4D9G
XUEV4VW
(126)
XTV3+8F
XTV3+8F
Ⓔ Front Connection C.B.A.
XTV3+8F
(127)
(122)
(121)
(121)
(128)
XTV3+8F
XTV3+8F
XTV3+8F
XYN3+F5B
XYN3+F8S
XYN3+F5B
XTV4+8F
XTV3+8F
XYN3+F5B
XYN3+F5B
XYN3+F5B
XYN3+F5B
(119)
(123)
XWC3B
(130)
XTV3-10F
(129)
XYN3+F5B
XYN3-F5B
(130)
XYN3+F8S
XWG4V4D9G
(120)
XTV3-6F
XUC3FP
(124)
XYN3+F8S
XYN3-F8S
XYN3+F5B
XWG4V4D9G
XUC3FP
XYN3+F8S
XYN3+F8S
XWGV3D6G
(115)
(131)
(113)
(116)
(132)
XUEV3VW
(117)
XWA3B
XNG3ES
1
2
3
4
5
6
7

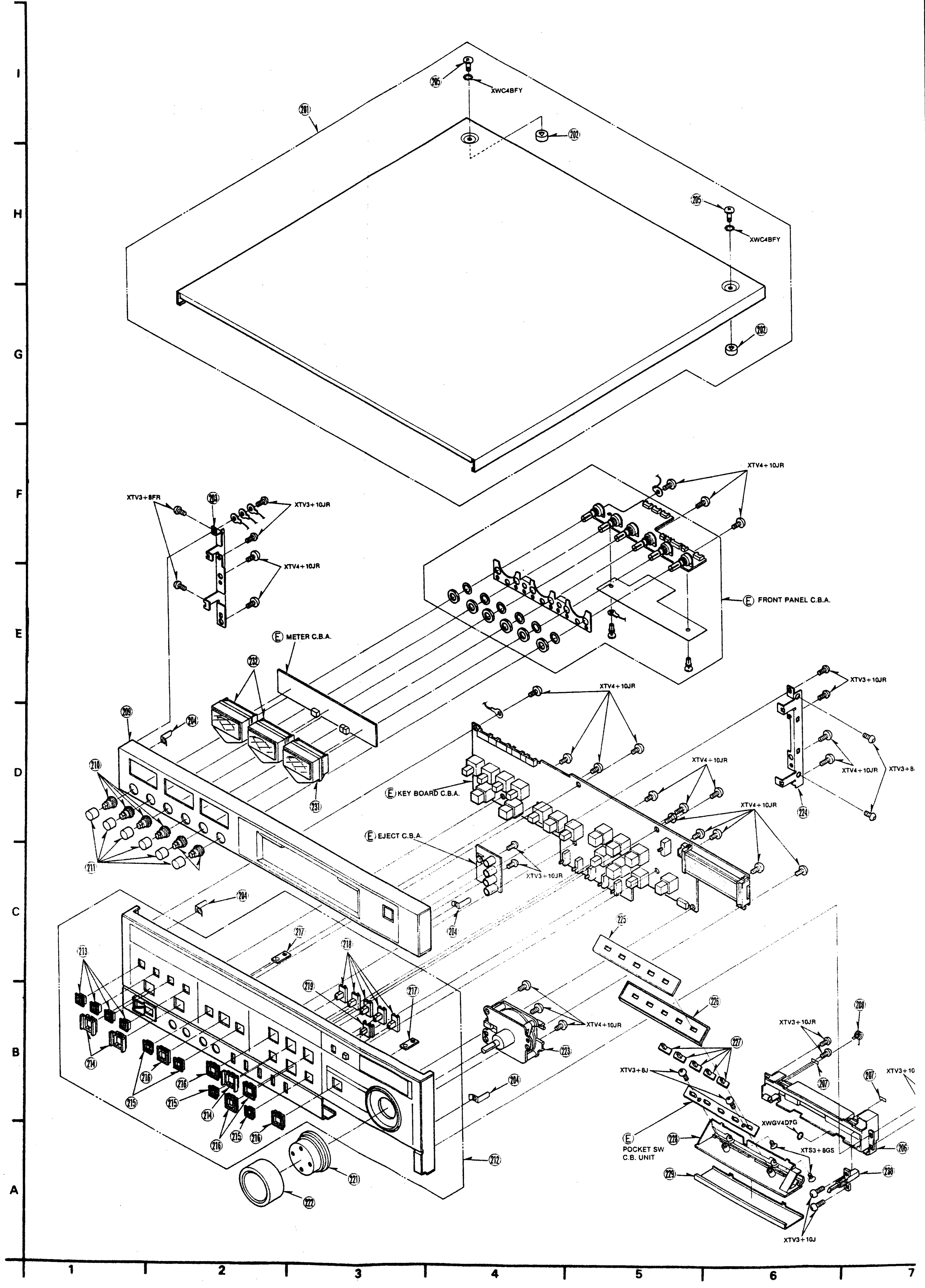
⑤ Front Load


I
H
G
F
E
D
C
B
A
(178)
(184)
XUC4FP
XWGV4D9G
(147)
(143)
(141)
XUC3FP
XUC3FP
(144)
XUC4FP
(145)
XUC3FP
(148)
(147)
XWGV3D6G
(150)
(151)
(150)
1

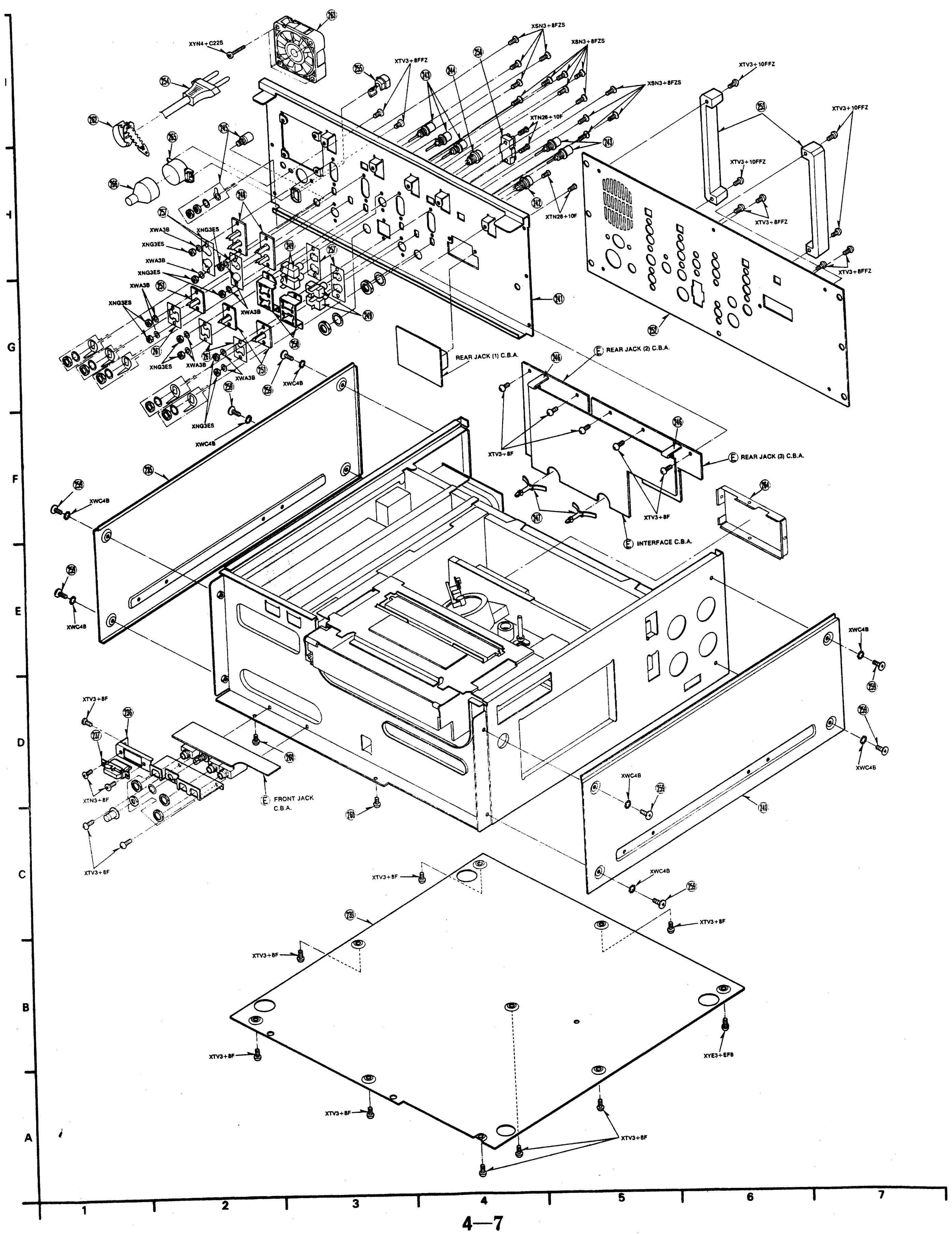
❺ *Front Loading Mechanism Section*


I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
XST3 + 5RS
192
* Ⓔ LAMP C.B.
177
XYN3 + F8RS
176
XTV3 + 6F
XUC25FP
188
182
175
XUC25FP
189
XUC3FP
179
174
XTS3 + 8JFZ
180
193
178
184
140
XUC4FP
XWGV4D9G
142
141
143
XUC3FP
158
144
XUC4FP
145
147
148
146
191
173
172
170
XTS3 + 8JFZ
XTV3 + 6F
Ⓔ1
Ⓔ2
167
XYN3 + C4S
Ⓔ ELEVATOR UNIT
149
XTV3 + 6FFZ
153
152
151
150
XWGV3D6G
XWGV3E6G
181
154
155
156
157
159
161
164
165
XWGV4D9G
XUC3FP
166
162
163
XYN2 + F10
XYN3 + F6S
171
169
183
185
186
187
190

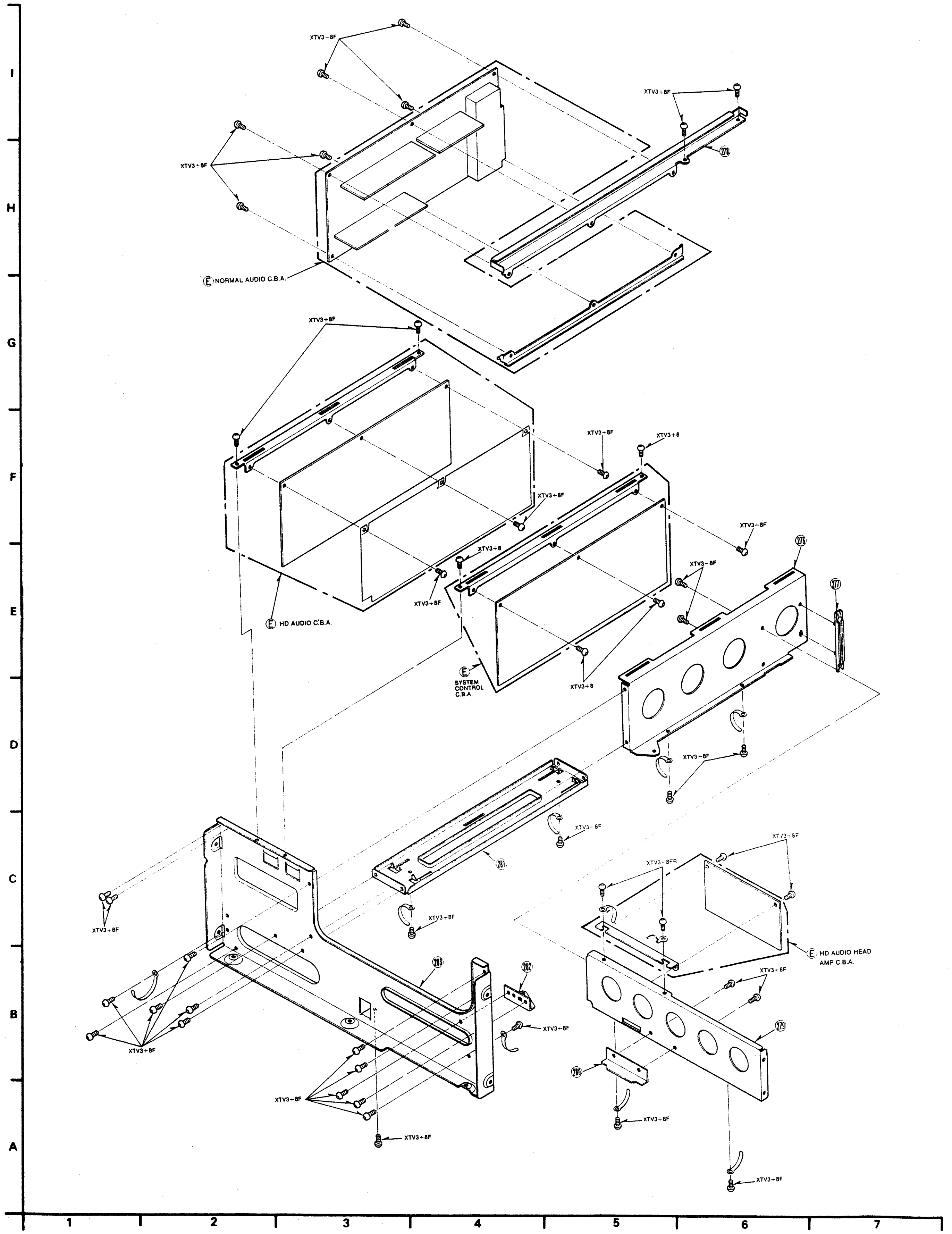
❻ *Chassis Frame Section-(1)*


I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
201
205
XWC4BFY
202
XTV3 + 8FR
203
XTV3 + 10JR
XTV4 + 10JR
Ⓔ FRONT PANEL C.B.A.
Ⓔ METER C.B.A.
232
231
209
204
210
211
Ⓔ KEY BOARD C.B.A.
Ⓔ EJECT C.B.A.
224
XTV3 + 8
212
213
214
215
216
217
218
219
221
222
223
225
226
227
XTV3 + 8J
Ⓔ POCKET SW C.B. UNIT
228
229
230
XWGV4D7G
XTS3 + 8GS
206
207
208
XTV3 + 10J

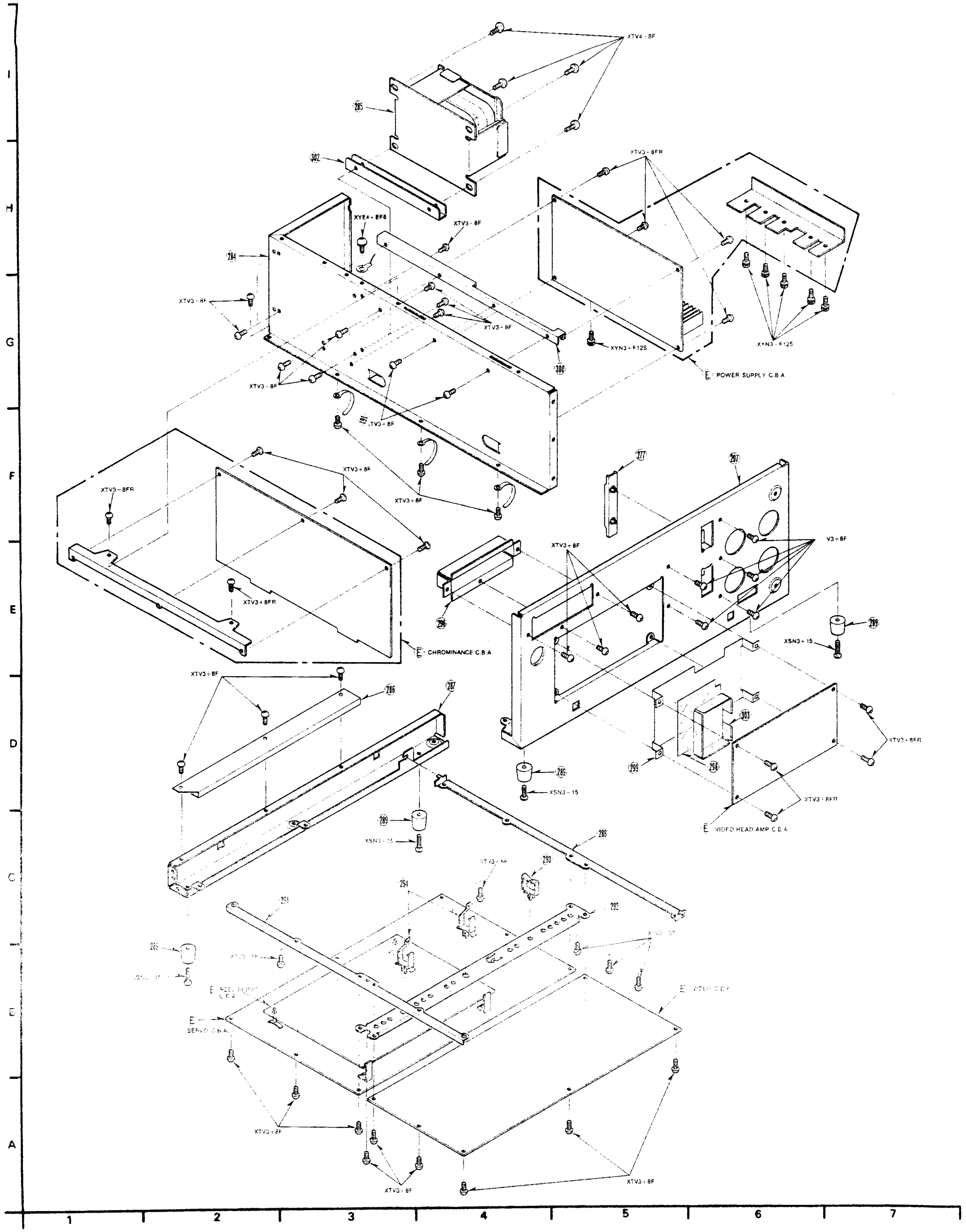
❼ Chassis Frame Section-(2)


XYH4+C22S
XSN3+8FZS
XSN3+8FZS
XSN3+8FZS
XTV3+8FFZ
XTN26+10F
XTN26+10F
XTV3+10FFZ
XTV3+10FFZ
XTV3+10FFZ
XTV3+8FFZ
XTV3+8FFZ
XWA3B
XNG3ES
XWC4B
REAR JACK (1) C.B.A.
Ⓔ REAR JACK (2) C.B.A.
Ⓔ REAR JACK (3) C.B.A.
Ⓔ INTERFACE C.B.A.
Ⓔ FRONT JACK C.B.A.
XTV3+8F
XTN3+8F
XYE3+EF8
A
B
C
D
E
F
G
H
I
1
2
3
4
5
6
7

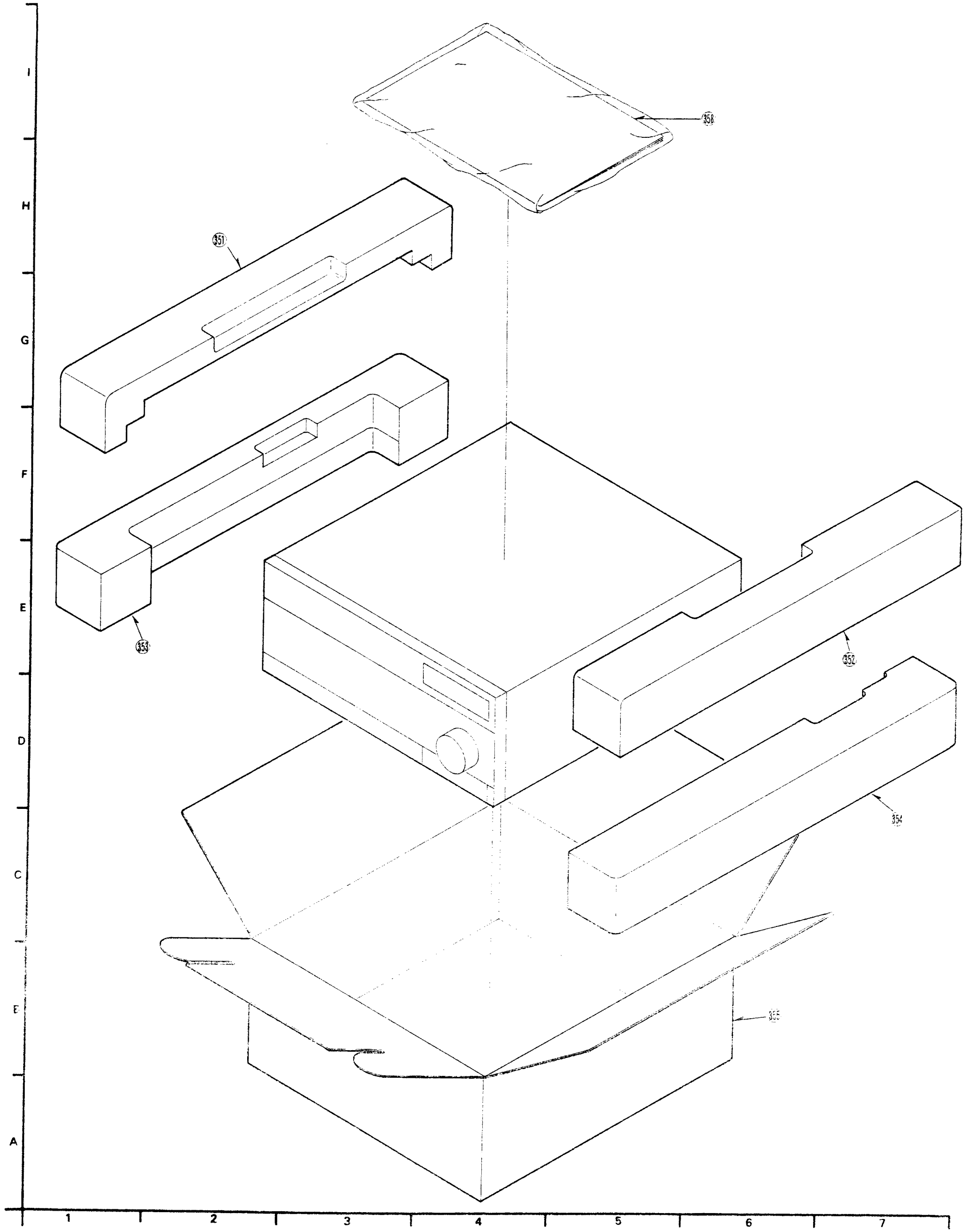
❽ Casing Parts Section-(1)


XTV3+8F
XTV3+8
XTV3+8FF
Ⓔ NORMAL AUDIO C.B.A.
Ⓔ HD AUDIO C.B.A.
Ⓔ SYSTEM CONTROL C.B.A.
Ⓔ HD AUDIO HEAD AMP C.B.A.
A
B
C
D
E
F
G
H
I
1
2
3
4
5
6
7

❾ Casing Parts Section-(2)


XTV4 - 8F
285
302
XTV3 - 8FR
XYE4 + EF6
XTV3 - 8F
284
XTV3 - 8F
XTV3 + 8F
XYN3 + F12S
XYN3 - F12S
300
E POWER SUPPLY C.B.A
XTV3 - 8F
191
XTV3 + 8F
XTV3 + 8F
XTV3 - 8FR
XTV3 + 8F
277
297
V3 + 8F
XTV3 + 8F
XTV3 + 8FR
296
E CHROMINANCE C.B.A
289
XSN3 + 15
XTV3 + 8F
286
287
303
XTV3 + 8FR
289
XSN3 - 15
299
298
XTV3 + 8FR
E VIDEO HEAD AMP C.B.A
289
XSN3 - 15
288
XTV3 - 8F
293
294
291
292
289
E REEL SERVO C.B.A
E SERVO C.B.A
E VIDEO C.B.A
XTV3 + 8F
XTV3 + 8F
XTV3 + 8F
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7

❿ Packing Parts Section


358
351
353
352
354
355
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7

Memo:

Ca

ORDER NO. VRD8701202
(Date of issue : MAR. 1987)

Video Cassette Recorder

Replacement Parts List

Panasonic/National VHS Hi-Fi

PAL

AG-6500-A -B -E -EN

Notes :

1. ● Be sure to make your orders of replacement parts according to this list.
   - ● "⟨R⟩" in Remarke column indicates recommended parts.
   - ● "⟨M⟩" in Remarke column indicates needed in the periodical maintenance.
2. IMPORTANT SAFETY NOTICE
   Components identified by " ! " have special characteristics important for safety.
   When replacing any of these components, use only the original ones.
   Meaning of simbol ! on this parts list is exactly same as simbol ⚠ on Schematic and Circuit Board Diagrams
3. Unless otherwise specified :
   All resistors are in OHMS (Ω), K=1,000Ω, M=1,000KΩ.
4. ITEM NUMBERS WITH CAPITAL LETTER E
   Item numbers with capital letter E (Example : E1, E2, ...) in Ref. No. column mean that parts so listed are shown with the E item numbers in the exploded viws.
5. C.B.A. marked with "■" show below the main assembled parts.
6. When ordering parts, use part No. only from Part No. column.

CONTENTS

SERVICING FIXTURES & TOOLS LIST 1
MECHANICAL REPLACEMENT PARTS LIST 2
ELECTRICAL REPLACEMENT PARTS LIST 4
- POWER SUPPLY C.B.A. 4
- SERVO C.B.A. 5
- REEL SERVO C.B.A. 11
- VIDEO C.B.A. 14
- NORMAL AUDIO C.B.A. 20
- HD AUDIO C.B.A. 24
- HD AUDIO HEAD AMP C.B.A. 26
- VIDEO HEAD AMP C.B.A. 27
- SYSTEM CONTROL C.B.A. 29
- INTERFACE C.B.A. 31

REAR JACK (1) 32
KEY BOARD C.B.A. 32
FRONT PANEL C.B.A. 34
CHROMINANCE C.B.A. 34
POCKET SWITCH C.B. UNIT 37
EJECT C.B.A. 37
METER C.B.A. 38
FRONT JACK C.B.A. 38
REAR JACK (3) C.B.A. 39
REAR JACK (2) C.B.A. 39
FRONT CONNECTION C.B.A. 40
ELEVATOR UNIT 40

1. SERVICING FIXTURES & TOOLS LIST

Ref.No	Part No.	Part Name & Description	Pcs	Remarks
	VFM8180HMDH	VHS Alignment Tape	1	
	VFK0329	Post Adj. Screwdriver	1	
	VFK0132	Back Tension Meter	1	
		(Tentelometer.		(T2-H7-UM)
		Made in U.S.A.)		
	VFK0191	Post Adj. Plate	1	
	VFK0133	Dial Torque Gauge	1	
	VFK0134	Plastic Clamper Only	1	
	VFK0180	Adaptor for VFK0133	1	
	VFK0190	Reel Table Height Fixture	1	
	VFK0135	Eccentric Screwdriver	1	
	VFK0192	Eccentric Screwdriver	1	
	VFK0343	Check Light	1	
	VFK0188	Cassette Holder Fixture	1	
	VFK0187	Tension Post Adj. Fixture	1	
	VFK03[illegible]	H-Position Adj. Fixture	1	
	VFK0330	Fine Adj. Screwdriver	1	
		(3mm. Phi)		
	VFK0335	Retaining Ring Remover	1	
	VFK0326	Hex.Wrench Set	1	
	MOR265	Morlytone Grease	1	
	VFK27	Head Cleaning Stick	1	
	VFK0243	Slip Ring Fixture	1	
	VFK0344	Post Height Adj. Fixture P1	1	
	VFK0345	Post Height Adj. Fixture P4	1	
	VFK66	Fan Type Tension Gauge	1	
	VFK0236	Tension Post Adj. Plate	1	
	VFK0394	FWD Sensor Adj. Fixture	1	
	VFK0393	REV Sensor Adj. Fixture	1	

2. MECHANICAL REPLACEMENT PARTS LIST

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
1(1)	VEH0344	UPPER CYLINDER UNIT	1	<R> <M>
2(1)	VEG0481	CYLINDER UNIT	1	<!> <R> <M>
3(1)	VXA1508	BRUSH UNIT	1	<R> <M>
4(1)	VSA0038	SLIP RING	1	<R> <M>
5(1)	VBS0024	ERASE HEAD UNIT	1	<R> <M>
6(1)	VMB1005	ERASE HEAD SPRING	1	
7(1)	VXP0761	ROLLER POST UNIT	1	
8(1)	VXP0302C	ROLLER POST UNIT	1	
9(1)	VXA1191	INCLIND BASE (S) UNIT	1	
10(1)	VXA1084	INCLIND BASE (B) UNIT	1	
11(1)	VXA1189	SHAFT HOLDER (S) UNIT	1	
12(1)	VXA1333	SHAFT HOLDER (T) UNIT	1	
13(1)	VMD0100	POST STOPPER	2	
14(1)	VMA4122	LEAD WIRE ANGLE	1	
15(1)	VMA4436	SHAFT HOLDER STOPPER (A)	2	
16(1)	VHN0014	"X" ADJUST NUT	1	
17(1)	VXA1334	LOADING BASE UNIT	1	
18(1)	VXL0753	LOADING ARM (L) UNIT	1	
19(1)	VXL0861	LOADING ARM (R) UNIT	1	
20(1)	VMB0669	LOADING SPRING	2	
21(1)	VXP0505	LOADING GEAR UNIT	2	
22(1)	VMX0257	ARM SLEEVE	2	
24(1)	VMX0280	POST SLEEVE	1	
25(1)	VMB0699	P4 SPRING	1	
26(1)	VHD0045	NUT	1	
27(1)	VMX0297	UPPER LIMITER	1	
28(1)	VDP0759	SUPPLY ROLLER	1	
29(1)	VMX0288	COLLAR	1	
30(1)	VMX0456	LOWER LIMITER (S)	1	
31(1)	VMX0571	LOWER LIMITER ROLLER	1	
32(1)	VMB0754	SUPPLY LIMITER SPRING	1	
33(1)	VXP0324	INERTIA ROLLER UNIT	1	
34(1)	VMB1251	ADJUST SPRING	1	
35(1)	VBR0069	A/C HEAD	1	<R> <M>
36(1)	VXA1990	A/C HEAD BASE	1	
37(1)	VXA1438	A/C HEAD BASE(B) UNIT	1	
38(1)	VMA4289	NUT BAR	1	
39(1)	VMB0668	A/C HEAD HEIGHT SPRING	1	
40(1)	VKF0637	P4 CAP	1	
41(3)	VDV0135	LOADING BELT (2)	1	<R> <M>
42(3)	VDP0750	IDLER PULLEY	1	
43(3)	VDP0735	LOADING INTERMEDIATE PULLEY	1	
44(2)	ON1108	PHOTO SENSOR	2	<R>
45(2)	VXA1899	SUPPLY FORWARD TENSION	1	
		SENSOR UNIT		
46(2)	VXA1787	SUPPLY REVERSE TENSION	1	
		SENSOR UNIT		
47(2)	VXA1788	REEL SENSOR BASE UNIT	1	
48(2)	VMD0145	LED HOLDER	1	
49(2)	LN58	LED	2	<R>
50(2)	VMA6190	SENSOR BASE (R)	1	
51(2)	VMA6191	SENSOR BASE (F)	1	
52(2)	VMA6192	SPRING ANGLE	1	
53(2)	VMG0283	CASSETTE UP STOPPER	1	
54(2)	VMS1743	SIDE LEVER SCREW	1	
55(2)	VMA6189	POSITION PLATE (L)	1	
56(2)	VMB1129	TENSION SPRING	1	
57(2)	VML1460	SENSOR LEVER	1	
58(2)	VXL1073	TENSION ARM UNIT	1	
59(2)	VMB1127	TENSION ARM SPRING	1	
60(2)	VXZ0148	BRAKE LEVER (L) UNIT	1	<R> <M>
61(2)	VXZ0149	BRAKE LEVER (R) UNIT	1	<R> <M>
62(2)	VMB0661	BRAKE SPRING	1	
63(2)	VXR0113	SUPPLY REEL TABLE UNIT	1	<R>
64(2)	VXR0113	TAKEUP REEL TABLE UNIT	1	<R>
65(2)	VMD0336	HALL IC BRACKET	1	
66(2)	VMA4891	REEL SENSOR BASE	1	
67(2)	VMA6005	WIRE STOPPER	1	
68(2)	VMA4406	CHASSIS BRACKET	1	
69(2)	VMA6195	POSITION PLATE (R)	1	
70(3)	VDV0122	LOADING BELT (1)	1	<R> <M>
71(3)	VEM0164	DD CAPSTAN UNIT	1	<!> <R>
72(3)	VML1336	SENSOR LEVER (R)	1	
73(3)	VMP0953	SENSOR SPRING (R)	1	
74(3)	VMA4893	SENSOR BASE (R)	1	
75(3)	VMA6326	WIRE STOPPER	1	
76(3)	VEK0854	DEW SENSOR UNIT	1	<R>
77(3)	VMD0555	SPACER	1	
78(3)	VSJ0063	PRESSURE ROLLER SOLENOID	1	
79(3)	VMB0719	PRESSURE SPRING	1	
80(3)	VML1339	SOLENOID LEVER (A)	1	
81(3)	VEM0135	LOADING MOTOR UNIT	1	<!> <R>
82(3)	VML1329	SOLENOID LEVER (B)	1	
83(3)	VXA1236	SOLENOID BRACKET UNIT	1	
84(3)	VMX0275	SLEEVE	1	
85(3)	VXA1790	OPENER UNIT	1	
87(3)	VHN0051	PRESSURE ROLLER SCREW	1	
88(3)	VXG0013S	PRESSURE ROLLER	1	<R> <M>
89(3)	VXL1423	PRESSURE ROLLER ARM(1) UNIT	1	
90(3)	VMB0947	PRESSURE ROLLER ARM SPRING	1	
91(3)	VXL0907	ADJUST LEVER UNIT	1	
92(3)	VXL0906	SUB LOADING ARM UNIT	1	
93(3)	VMB0723	SUB LOADING ARM SPRING	1	
94(3)	VMB0949	LEVER SPRING	1	
95(3)	VMM0091	ACTION SLIDE SUB LEVER	1	
96(3)	VMX0122	SLIDE WASHER (A)	4	
97(3)	VXL0901	ACTION SLIDE LEVER UNIT	1	
98(3)	VHD0045	NUT	1	
99(3)	VXL0995	PULL OUT ARM UNIT	1	
100(3)	VMB0752	PULL OUT ARM SPRING	1	
101(3)	VXL0900	ACTION LEVER UNIT	1	
102(3)	VML1327	ACTION SUB LEVER UNIT	1	
103(3)	VMB0950	ACTION SUB LEVER SPRING	1	
104(3)	VXK0496	PRESSURE ROLLER BASE UNIT	1	
105(3)	VMB0948	ACTION SLIDER RETURN SPRING	1	
106(3)	VMA6200	SPRING HOOK	1	
107(3)	VXL0944	ACTION LEVER UNIT	1	
108(3)	VDP0748	LARGE PULLEY	1	
109(4)	VMA5372	NUT PLATE	1	
110(4)	VMA5826	CASSETTE SUPPORT ANGLE	1	
111(4)	VSM0043	SAFETY TAB SWITCH	1	<R>
112(4)	VMA6203	SAFETY TAB SWITCH ANGLE	1	
113(4)	VDG0017	INTERMEDIATE GEAR	1	
114(4)	VDG0096	CAM GEAR	1	<R>
115(4)	VMX0268	ACTION GEAR SLEEVE	1	
116(4)	VDG0016	ACTION GEAR	1	
117(4)	VMA4088	ACTION GEAR HOLDER	1	
118(4)	VXL0898	SECTOR GEAR	1	
119(4)	VMX0308	SLIDE WASHER	8	
120(4)	VXL1074	MAIN LEVER UNIT	1	
121(4)	VSJ0062	BRAKE SOLENOID	2	
		(SUPPLY) (TAKEUP)		
122(4)	VXK0606	SOLENOID BASE (1) UNIT	1	
123(4)	VMM0114	MAIN BRAKE RELEASE LEVER(L)	1	
124(4)	VMM0115	MAIN BRAKE RELEASE LEVER(R)	1	
125(4)	VMD0277	BRAKE RELEASE BRACKET	1	
126(4)	VMA6300	FRONT CONNECTION C.B. ANGLE	1	
127(4)	VXK0603	SUB CHASSIS (1) UNIT	1	
128(4)	VMA4895	MODE SELECT SWITCH HOLDER	1	
129(4)	VSS0057	MODE SELECT SWITCH	1	<R>
130(4)	VMA6194	MOTOR BASE	2	
131(4)	KFN56DB3AS	REEL MOTOR (SUPPLY)	1	<!> <R>
132(4)	KFN56DB3AT	REEL MOTOR (TAKEUP)	1	<!> <R>
133(4)	VGF0021	BELT COVER	1	
140(5)	VXA2356	CASSETTE HOLDER UNIT	1	
141(5)	VMB1310	WIPER SPRING (L)	1	
142(5)	VDG0182	WIPER GEAR (L)	1	
143(5)	VML1712	WIPER ARM	2	
144(5)	VDG0235	LARGE INTERMEDIATE GEAR	2	
145(5)	VDG0119	SHAFT GEAR	2	
146(5)	VMD0091	PHOTO TR HOLDER	2	
147(5)	VXA2354	SIDE PLATE (L) UNIT	1	
148(5)	VML1711	FRONT OPENER LINK	1	
149(5)	VMD0768	FRONT GUIDE (L)	1	
150(5)	VMS2350	BLINDER PANEL SHAFT	2	
151(5)	VKF0886	BLINDER PANEL	1	<R>
152(5)	VMS2304	MAIN SHAFT	1	
153(5)	VMD0767	FRONT GUIDE (R)	1	
154(5)	VXA2355	SIDE PLATE (R) UNIT	1	
155(5)	VDG0233	CLUTCH GEAR	1	

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
156(5)	VMX0531	CLUTCH SPACER	1	
157(5)	VDG0234	WARM WHEEL	1	
158(5)	VDG0236	SMALL INTERMEDIATE GEAR	2	
159(5)	VMB1402	CLUTCH SPRING	1	
160(5)	VSM0026	SWITCH	1	<R>
161(5)	VMX0530	CLUTCH WASHER	1	
162(5)	VMA6702	SWITCH ANGLE	1	
163(5)	VSM0049	SWITCH	2	<R>
164(5)	VDG0183	WIPER GEAR (R)	1	
165(5)	VMB1309	WIPER SPRING (R)	1	
166(5)	VXP0670	PULLEY SHAFT UNIT	1	
167(5)	VDV0144	LOADING BELT	1	<R> <M>
170(5)	VMD0454	SPRING HOLDER	1	
171(5)	VMA6715	SWITCH BASE	1	
172(5)	VMB1091	SAFETY TAB SPRING	1	
173(5)	VMD0453	SAFETY TAB KNOB	1	
174(5)	VMD0452	CASSETTE GUIDE	1	
175(5)	VSM0047	CASSETTE IN SWITCH	1	<R>
176(5)	VMD0492	MIRROR DRIVE PANEL (L)	1	
177(5)	VXA1795	MIRROR UNIT	1	
178(5)	VDP0944	WIPER ROLLER (S)	2	
179(5)	VMA6494	FRONT LOADING TOP PLATE	1	
180(5)	VMD0491	MIRROR DRIVE PANEL (R)	1	
181(5)	VMB1171	BLINDER SPRING	1	
182(5)	VMB1125	MIRROR SPRING	1	
183(5)	VDB0660	WARM SHAFT BEARING	1	
184(5)	VDP0918	CASSETTE HOLDER ROLLER(S)	2	
185(5)	VMB1400	PULLEY SHAFT SPRING	1	
186(5)	VMX0934	WARM WASHER	1	
187(5)	VDG0232	WARM UNIT	1	
188(5)	VMS2605	MIRROR SHAFT (B)	1	
189(5)	VMS2604	MIRROR SHAFT (A)	1	
190(5)	VXA2902	FRONT LOADING UNIT	1	
191(5)	PN150NV	PHOTO TRANSISTOR	2	<R>
192(5)	VLL0019	LAMP	2	<R>
193(5)	VXA1797	TOP PLATE UNIT	1	
195(2)	DN838A	IC	2	<R>
201(6)	VYF0885	TOP PANEL UNIT	1	
202(6)	VMX0871	SCREW SPACER	2	
203(6)	VMP0912	REINFORCEMENT ANGLE (L)	1	
204(6)	VSC1703	GROUND ANGLE	4	
205(6)	VHD0222	SCREW	2	
206(6)	VGQ0981	SWITCH BOX	1	
207(6)	VMT0157	RUBBER CUSHION	2	
208(6)	VMB1493	EJECT SPRING	1	
209(6)	VYP1647	FRONT PANEL UNIT (UPPER)	1	<R>
210(6)	VGU2943	VOLUME KNOB	6	<R>
211(6)	VMG0354	RUBBER CAP	6	<R>
212(6)	VYP1649	FRONT PANEL UNIT (LOWER)	1	AG-6500-E/B
212(6)	VYP1889	FRONT PANEL UNIT (LOWER)	1	AG-6500-A/EN
213(6)	VGQ0977	GUARD SPACER (A)	4	
214(6)	VGQ0974	GUARD SPACER (B)	3	
215(6)	VGQ0976	GUARD SPACER (C)	4	
216(6)	VGQ0975	GUARD SPACER (D)	5	
217(6)	VMP0917	SPACER	2	
218(6)	VGU2946	SELECT SWITCH KNOB	5	<R>
219(6)	VGU2939	RESET KNOB	1	<R>
221(6)	VGU2941	SEARCH KNOB	1	<R>
222(6)	VMG0353	RUBBER CAP	1	<R>
223(6)	VSP0185	SEARCH DIAL UNIT	1	
224(6)	VMP0911	REINFORCEMENT ANGLE (R)	1	
225(6)	VGH1125	PANEL	1	
226(6)	VKF0719	SWITCH PANEL	1	
227(6)	VGU2945	SWITCH KNOB	5	
228(6)	VKF0718	C.BOARD HOLDER	1	
229(6)	VGK1487	SURFACE PANEL	1	<R>
230(6)	VGU2944	LOCK UNIT	1	
231(6)	VSE0066	TRACKING METER	1	<R>
232(6)	VSE0065	AUDIO METER	2	<R>
235(7)	VGM0160	SIDE COVER (L)	1	<R>
236(7)	VMP0909	FRONT JACK ANGLE	1	
237(7)	VSW0031	POWER SWITCH	1	<!> <R>
239(7)	VKM0676	BOTTOM COVER	1	<R>
240(7)	VGM0159	SIDE COVER (R)	1	<R>
241(7)	VJH0426	REAR JACK ANGLE	1	
242(7)	VJP1132	DUB IN CONNECTOR	1	
243(7)	VJS1440	BNC JACK	5	
244(7)	VJS1132	DUB OUT CONNECTOR	1	
245(7)	VJH0082	GROUND TERMINAL	1	
246(7)	VKC0129	P.C.BOARD CLAMPER	2	
247(7)	VMX1028	P.C.BOARD CLAMPER	2	
248(7)	VJJ0081	PHONO PIN JACK	2	<R>
249(7)	VJJ0083	PHONO PIN JACK	4	<R>
		(WITH SWITCH)		
250(7)	VMA5765	JACK HOLDER	2	
251(7)	VJJ0082	PHONO PIN JACK	3	<R>
252(7)	VGH1126	REAR PANEL	1	
253(7)	VGQ0978	REAR INSULATOR	2	
254(7)	VJA0169	AC POWER CORD	1	AG-6500-E/EN <!><R>
254(7)	VJA0087	AC POWER CORD	1	AG-6500-A <!><R>
254(7)	VJA0074	AC POWER CORD	1	AG-6500-B <!><R>
255(7)	VDB0293	AC POWER CORD BUSHING	1	<!> <R>
257(7)	VMP1029	PHONO PIN JACK PLATE	4	
258(7)	VJS1437	TV CONNECTOR	1	<R>
259(7)	VHD0300	SCREW	8	
260(7)	VHD0299	SCREW	2	
261(7)	VMP1028	PHONO PIN JACK PLATE	3	
262(7)	VMP0253	AC CORD BAND	1	
263(7)	VRF0021	FAN MOTOR	1	<!>
264(7)	VSC1697	HD AUDIO HEAD AMP SHIELD	1	
		CASE (TOP)		
265(7)	ESE37212	VOLTAGE SELECT SWITCH	1	<!>
266(7)	VMX0235	VOLTAGE SELECT SWITCH COVER	1	<!>
276(8)	VMP0901	CHASSIS FRAME (LEFT)	1	
277(8)	VGQ1016	C.BOARD GUIDE RAIL	2	
278(8)	VMP0896	SIDE FRAME SUPPORT ANGLE	1	
279(8)	VMP0898	CENTER FRAME	1	
280(8)	VMP0900	CHASSIS FRAME (CENTER)	1	
281(8)	VMP0904	C.BOARD HOLDER PLATE	1	
282(8)	VMP0899	CHASSIS FRAME (R)	1	
283(8)	VXA2589	FRONT FRAME UNIT	1	
284(9)	VMP0897	REAR FRAME	1	
285(9)	VTP0217	POWER TRANSFORMER	1	<!> <R>
286(9)	VSC1718	SHIELD CASE	1	
287(9)	VXA2590	SIDE FRAME (L) UNIT	1	
288(9)	VMP0908	C.BOARD ANGLE	1	
289(9)	VMG0172	RUBBER FOOT	4	
291(9)	VMP0906	C.BOARD ANGLE	1	
292(9)	VMP0907	C.BOARD ANGLE	1	
293(9)	VJF0022	LEAD WIRES CLAMPER	1	
294(9)	VJF0056	LEAD WIRES CLAMPER	2	
296(9)	VKH0151	FRAME HANDLE	1	
297(9)	VXA2591	SIDE FRAME	1	
299(9)	VXA2665	C.BOARD ANGLE	1	
300(9)	VMP1023	TRANSFORMER ANGLE (A)	1	
302(9)	VMP1024	TRANSFORMER ANGLE (B)	1	
303(9)	VSC1700	VIDEO HEAD AMP SHIELD CASE	1	
		(TOP)		
351(10)	VPN1433	LEFT TOP CUSHION	1	
352(10)	VPN1431	RIGHT TOP CUSHION	1	
353(10)	VPN1434	LEFT BOTTOM CUSHION	1	
354(10)	VPN1432	RIGHT BOTTOM CUSHION	1	
355(10)	VPG3066	PACKING CASE	1	AG-6500-E <R>
355(10)	VPG3067	PACKING CASE	1	AG-6500-B <R>
355(10)	VPG3068	PACKING CASE	1	AG-6500-A <R>
355(10)	VPG3069	PACKING CASE	1	AG-6500-EN <R>
358(10)	VQT2076	OPERATING INSTRUCTIONS	1	<!> <R>
358(10)	VQT2077	OPERATING INSTRUCTIONS	1	AG-6500-E ONLY <!><R>

3. ELECTRICAL REPLACEMENT PARTS LIST

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
		VEP01267A	POWER SUPPLY C.B.A.	1	<!><R>
		VEP02261A	SERVO C.B.A.	1	INCLUDING THE FRAMING
					PACK (1) C.B.A.
					(VEP00G60A), FRAMING
					PACK (2) C.B.A.
					(VEP00G61A) <R>
		VEP02224B	REEL SERVO C.B.A.	1	<R>
		VEP03389A	VIDEO C.B.A.	1	INCLUDING THE VIDEO
					METER PACK C.B.A.
					(VEP00J21A) <R>
		VEP04132B	NORMAL AUDIO C.B.A.	1	INCLUDING THE TIME
					CODE PACK C.B.A.
					(VEP00G62A), SUB AUDIO
					PACK (1) C.B.A.
					(VEP04133A), SUB AUDIO
					PACK (2) C.B.A.
					(VEP04139A) <R>
		VEP04134B1	HD AUDIO C.B.A.	1	<R>
		VEP04135B1	HD AUDIO HEAD AMP C.B.A.	1	<R>
		VEP05079B	VIDEO HEAD AMP C.B.A.	1	<R>
		VEP06319B1	SYSTEM CONTROL C.B.A.	1	<R>
		VEP06391A	INTERFACE C.B.A.	1	<R>
		VEP06321A	REAR JACK (1) C.B.A.	1	<R>
		VEP06322B	KEY BOARD C.B.A.	1	<R>
		VEP06324A	FRONT PANEL C.B.A.	1	<R>
		VEP08114A1	CHROMINANCE C.B.A.	1	<R>
		VEK3076	POCKET SW C.B. UNIT	1	<R>
		VEP00G04A	EJECT C.B.A.	1	<R>
		VEP00G60A	FRAMING PACK (1) C.B.A.	1	PARTS LIST IS
					INCLUDED IN SERVO
					C.B.A. (VEP02261A) <R>
		VEP00G61A	FRAMING PACK (2) C.B.A.	1	PARTS LIST IS
					INCLUDED IN SERVO
		VEP00G62A	TIME CODE PACK C.B.A.	1	PARTS LIST IS
					INCLUDED IN NORMAL
					AUDIO C.B.A.
					(VEP04132B) <R>
		VEP00G66A	METER C.B.A.	1	<R>
		VEP00F76A	FRONT JACK C.B.A.	1	<R>
		VEP00G67B	REAR JACK (3) C.B.A.	1	<R>
		VEP00F79A	REAR JACK (2) C.B.A.	1	<R>
		VEP04133A	SUB AUDIO PACK (1) C.B.A.	1	PARTS LIST IS
					INCLUDED IN NORMAL
					AUDIO C.B.A.
					(VEP04132B) <R>
		VEP04139A	SUB AUDIO PACK (2) C.B.A.	1	PARTS LIST IS
					INCLUDED IN NORMAL
					AUDIO C.B.A.
					(VEP04132B) <R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
		VEP00J21A	VIDEO METER PACK C.B.A.	1	PARTS LIST IS
					INCLUDED IN VIDEO
					C.B.A. (VEP03389A)<R>
		VEP00A31	FRONT CONNECTION C.B.A.	1	<R>
		VEM0256	ELEVATOR UNIT	1	<R>
	■	VEP01267A	POWER SUPPLY C.B.A.		
			CAPACITORS		
C1001		ECQE2A224MW	MYLAR 100V 0.22U	1	
C1002		ECET25R682SW	ELECTROLYTIC 25V 6800U	1	
C1003		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C1005		ECEA1AU101	ELECTROLYTIC 10V 100U	1	
C1006		ECEA1AU101	ELECTROLYTIC 10V 100U	1	
C1007		ECET35R472SW	ELECTROLYTIC 35V 4700U	1	
C1008		ECEA1VU101	ELECTROLYTIC 35V 100U	1	
C1009		ECET35R472SW	ELECTROLYTIC 35V 4700U	1	
C1010		ECEA1EU331	ELECTROLYTIC 25V 330U	1	
C1011		ECEA1CU471	ELECTROLYTIC 16V 470U	1	
C1012		ECEA1CU100	ELECTROLYTIC 16V 10U	1	
C1013		ECEA1CU100	ELECTROLYTIC 16V 10U	1	
C1014		ECQM1H222KV	MYLAR 50V 2200P	1	
C1015		ECQM1H822KV	MYLAR 50V 8200P	1	
C1016		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C1017		ECEA1CU100	ELECTROLYTIC 16V 10U	1	
C1018		ECEA1CU470	ELECTROLYTIC 16V 47U	1	
D1001		D4BB10	DIODE	1	<!><R>
D1002		RD16EB	ZENER 16V	1	<R>
D1003		S4VB10	DIODE	1	<!><R>
D1004		ERC84009	DIODE	1	<R>
D1005		S4VB10	DIODE	1	<!><R>
D1007		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D1008		MA4130M	DIODE	1	<R>
D1009		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D1010		8P2M	THYRISTOR	1	SD<R>
D1011		MA165	DIODE	1	OR 1SS119, 1SS254<R>
F1001		XBA2C20TB0	FUSE	1	<!><R>
F1002		XBA2C31TB0	FUSE	1	<!><R>
F1003		XBA2C31TB0	FUSE	1	<!><R>
F1004		XBA2C31TB0	FUSE	1	<!><R>
IC1001		UPC393C	IC	1	<R>
IC1002		UPC4556C	IC	1	<R>
IC1003		SI3052V	IC	1	<!><R>
IC1004		SI3052V	IC	1	<!><R>
IC1005		SI3122V	IC	1	<!><R>
L1001		VTQ0006	COIL	1	<!><R>
L1002		VLQ0195	COIL	1	
P1003		VJP1233T	CONNECTOR(MALE) 6P	1	<!>
P1004		VJP1235T	CONNECTOR(MALE) 8P	1	
P1005		VJP1230	CONNECTOR(MALE) 3P	1	
P1006		VJP1233G	CONNECTOR(MALE) 6P	1	
P1007		VJP1229T	CONNECTOR(MALE) 2P	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
P1008		VJP1229	CONNECTOR(MALE) 2P	1	
P1009		VJP1234T	CONNECTOR(MALE) 7P	1	
P1010		VJP1230G	CONNECTOR(MALE) 3P	1	
P1011		VJP1229	CONNECTOR(MALE) 2P	1	
Q1001		2SD1266	TRANSISTOR	1	(P,Q,R)<R>
Q1002		2SD639	TRANSISTOR	1	(P,Q)<R>
Q1003		2SD1444A	TRANSISTOR	1	(Q,R)<!><R>
Q1004		2SB643	TRANSISTOR	1	(R,S)<R>
Q1005		2SD637	TRANSISTOR	1	(Q,R)<R>
			RESISTORS		
R1001		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R1002		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R1003		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R1004		EROS2CKF5101	METAL OXIDE 1/4W 5.1K	1	
R1005		EROS2CKF3001	METAL OXIDE 1/4W 3K	1	
R1006		ERDS2TJ102	CARBON 1/4W 1K	1	
R1007		ERDS2TJ104	CARBON 1/4W 100K	1	
R1008		ERDS2TJ104	CARBON 1/4W 100K	1	
R1009		ERDS2TJ104	CARBON 1/4W 100K	1	
R1010		ERDS2TJ102	CARBON 1/4W 1K	1	
R1011		ERDS2TJ102	CARBON 1/4W 1K	1	
R1012		ERDS2TJ103	CARBON 1/4W 10K	1	
R1013		ERDS2TJ103	CARBON 1/4W 10K	1	
R1014		ERDS2TJ471	CARBON 1/4W 470	1	
R1015		ERDS2TJ103	CARBON 1/4W 10K	1	
R1016		ERDS2TJ105	CARBON 1/4W 1000K	1	
R1017		ERDS2TJ103	CARBON 1/4W 10K	1	
R1018		ERDS2TJ104	CARBON 1/4W 100K	1	
R1019		ERDS2TJ223	CARBON 1/4W 22K	1	
R1020		ERDS2TJ823	CARBON 1/4W 82K	1	
R1021		ERDS2TJ104	CARBON 1/4W 100K	1	
			MISCELLANEOUS		
		SJT777	PIN	2	<!>
		VJS0039	FUSE HOLDER	8	<!>
		VSC1323	HEAT	1	
		VSC1709	HEAT SINK	1	
		VSC1817	HEAT SINK	1	
	■	VEP02261A	SERVO C.B.A.		INCLUDING THE FRAMING
					PACK (1) C.B.A.
					(VEP00G60A), FRAMING
					PACK (2) C.B.A.
					(VEP00G61A)
			CAPACITORS		
C201		ECUX1H151KCN	CHIP 50V 150P	1	
C202		ECUX1H331KBN	CHIP 50V 330P	1	
C203		ECUX1H331KBN	CHIP 50V 330P	1	
C204		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C251		ECUX1H100DCN	CHIP 50V 10P	1	
C252		ECUX1H390KCN	CHIP 50V 39P	1	
C253		ECUX1H561KBN	CHIP 50V 560P	1	
C254		ECQM1H102JV	MYLAR 50V 1000P	1	
C255		ECUX1H331KBN	CHIP 50V 330P	1	
C256		ECEA1CKS330	ELECTROLYTIC 16V 33U	1	
C2001		ECQB1H472JH	MYLAR 50V 4700P	1	
C2002		ECQB1H472JH	MYLAR 50V 4700P	1	
C2003		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C2004		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C2005		ECCF1H680JC	CERAMIC 50V 68P	1	
C2006		ECCF1H680JC	CERAMIC 50V 68P	1	
C2007		ECCF1H680JC	CERAMIC 50V 68P	1	
C2008		ECCF1H680JC	CERAMIC 50V 68P	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C2009		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2010		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2011		ECQV1H823JZ	MYLAR 50V 0.082U	1	
C2012		ECQM1H223JV	MYLAR 50V 0.022U	1	
C2013		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2014		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C2015		ECEA1CKN100	ELECTROLYTIC 16V 10U	1	
C2016		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2017		ECQM1H153JV	MYLAR 50V 0.015U	1	
C2018		ECEA50ZR33	ELECTROLYTIC 50V 0.33U	1	
C2019		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C2020		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C2021		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C2022		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2023		ECCF1H330JC	CERAMIC 50V 33P	1	
C2024		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C2025		ECEA50ZR68	ELECTROLYTIC 50V 0.68U	1	
C2026		ECEA50ZR68	ELECTROLYTIC 50V 0.68U	1	
C2027		ECEA50ZR33	ELECTROLYTIC 50V 0.33U	1	
C2028		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C2029		ECQM1H103JV	MYLAR 50V 0.01U	1	
C2030		ECQM1H103JV	MYLAR 50V 0.01U	1	
C2031		ECQV1H334JZ	MYLAR 50V 0.33U	1	
C2032		ECEA50ZR33	ELECTROLYTIC 50V 0.33U	1	
C2033		ECEA50ZR33	ELECTROLYTIC 50V 0.33U	1	
C2034		ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C2035		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C2036		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C2037		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2038		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2039		ECQV1H563JZ	MYLAR 50V 0.056U	1	
C2040		ECQM1H272JV	MYLAR 50V 2700P	1	
C2041		ECEA10V47T	ELECTROLYTIC 10V 47U	1	
C2042		ECEA0JU471	ELECTROLYTIC 6.3V 470U	1	
C2043		ECQV1H224JZ	MYLAR 50V 0.22U	1	
C2044		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2045		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2046		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2047		ECQM1H333JV	MYLAR 50V 0.033U	1	
C2048		ECKF1H221KB	CERAMIC 50V 220P	1	
C2049		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2050		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2051		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C2052		ECQV1H184JZ	MYLAR 50V 0.18U	1	
C2053		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2054		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2055		ECQB1H683JH	MYLAR 50V 0.068U	1	
C2056		ECQM1H102JV	MYLAR 50V 1000P	1	
C2057		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C2058		ECKF1H102KB	CERAMIC 50V 1000P	1	
C2059		ECQM1H392JV	MYLAR 50V 3900P	1	
C2060		ECKF1H221KB	CERAMIC 50V 220P	1	
C2061		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2062		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2063		ECQV1H474JZ	MYLAR 50V 0.47U	1	
C2064		ECKF1H331KB	CERAMIC 50V 330P	1	
C2065		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2066		ECQP1H103GZ	MYLAR 50V 0.01U	1	
C2068		ECQM1H683JV	MYLAR 50V 0.068U	1	
C2069		ECQM1H683JV	MYLAR 50V 0.068U	1	
C2070		ECQP1H104GZ	MYLAR 50V 0.1U	1	
C2071		ECQM1H103JV	MYLAR 50V 0.01U	1	
C2072		ECKF1H102KB	CERAMIC 50V 1000P	1	
C2073		ECQP1H104GZ	MYLAR 50V 0.1U	1	
C2074		ECQM1H563JV	MYLAR 50V 0.056U	1	
C2075		ECKF1H561KB	CERAMIC 50V 560P	1	
C2076		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C2077		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2078		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2082		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2083		ECQV1H154JZ	MYLAR 50V 0.15U	1	
C2085		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2086		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C2087		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C2088		ECKF1H103ZF	CERAMIC 50V 0.01U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C2089		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2090		ECQM1H103JV	MYLAR 50V 0.01U	1	
C2091		ECQM1H333JV	MYLAR 50V 0.033U	1	
C2092		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C2093		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C2094		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C2095		ECEA1HK3R3	ELECTROLYTIC 50V 3.3U	1	
C2096		ECEA1EK100	ELECTROLYTIC 25V 10U	1	
C2097		ECQM1H683JV	MYLAR 50V 0.068U	1	
C2098		ECEA1EU101	ELECTROLYTIC 25V 100U	1	
C2099		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2100		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2101		ECQM1H822JV	MYLAR 50V 8200P	1	
C2102		ECEA50ZR22	ELECTROLYTIC 50V 0.22U	1	
C2103		ECEA50ZR22	ELECTROLYTIC 50V 0.22U	1	
C2104		ECEA50ZR22	ELECTROLYTIC 50V 0.22U	1	
C2105		ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C2106		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2107		ECQV1H474JZ	MYLAR 50V 0.47U	1	
C2108		ECQM1H562JV	MYLAR 50V 5600P	1	
C2109		ECQM1H562JV	MYLAR 50V 5600P	1	
C2110		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C2111		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C2112		ECEA1EKN3R3	ELECTROLYTIC 25V 3.3U	1	
C2113		ECKF1H471KB	CERAMIC 50V 470P	1	
C2114		ECQV1H154JZ	MYLAR 50V 0.15U	1	
C2115		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2116		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2117		ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C2118		ECKF1H331KB	CERAMIC 50V 330P	1	
C2119		ECQM1H562JV	MYLAR 50V 5600P	1	
C2120		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C2121		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2122		ECEA50MR68	ELECTROLYTIC 50V 0.68U	1	
C2123		ECKF1H272KB	CERAMIC 50V 2700P	1	
C2124		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C2125		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C2126		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2127		ECKF1H152KB	CERAMIC 50V 1500P	1	
C2128		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2129		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2130		ECEA16V10T	ELECTROLYTIC 16V 10U	1	
C2131		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C2132		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2133		ECKF1H331KB	CERAMIC 50V 330P	1	
C2134		ECQM1H682JV	MYLAR 50V 6800P	1	
C2135		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C2136		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2137		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2138		ECQB1H472JH	MYLAR 50V 4700P	1	
C2139		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2140		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2141		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2142		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2143		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2144		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2145		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2146		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2147		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2148		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2149		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2150		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2151		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2152		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2153		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2154		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2155		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2156		ECEA1CU331	ELECTROLYTIC 16V 330U	1	
C2157		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2158		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2159		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2160		ECEA1CU331	ELECTROLYTIC 16V 330U	1	
C2161		ECEA1HKR33	ELECTROLYTIC 50V 0.33U	1	
C2162		ECEA0JK330	ELECTROLYTIC 6.3V 33U	1	
C2165		ECEA1HKR33	ELECTROLYTIC 50V 0.33U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C2166		ECCF1H151JC	CERAMIC 50V 150P	1	
C2167		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2168		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2169		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2170		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2171		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C2172		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2173		ECCF1H220JC	CERAMIC 50V 22P	1	
C2174		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C2175		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C2176		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C2177		ECQP1H103GZ	MYLAR 50V 0.01U	1	
C2178		ECQP1H124GZ	MYLAR 50V 0.12U	1	
C2179		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C2180		ECQB1H103JH	MYLAR 50V 0.01U	1	
C2181		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2182		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2183		ECEA16V10T	ELECTROLYTIC 16V 10U	1	
C2184		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2185		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C2186		ECEA1HK4R7	ELECTROLYTIC 50V 4.7U	1	
C2501		ECQM1H102JV	MYLAR 50V 1000P	1	
C2502		ECQM1H102JV	MYLAR 50V 1000P	1	
C2503		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C2504		ECQM1H103JV	MYLAR 50V 0.01U	1	
C2505		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C2506		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C2507		ECQM1H102JV	MYLAR 50V 1000P	1	
C2508		ECQM1H102JV	MYLAR 50V 1000P	1	
C2510		ECQB1H123JH	MYLAR 50V 0.012U	1	
C2511		ECQB1H123JH	MYLAR 50V 0.012U	1	
C2512		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2513		ECCF1H680JC	CERAMIC 50V 68P	1	
C2514		ECCF1H680JC	CERAMIC 50V 68P	1	
C2515		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C2516		ECQB1H123JH	MYLAR 50V 0.012U	1	
C2517		ECKF1H152KB	CERAMIC 50V 1500P	1	
C2518		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C2519		ECKF1H102KB	CERAMIC 50V 1000P	1	
C2520		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2521		ECKF1H103KB	CERAMIC 50V 0.01U	1	
C2522		ECKF1H103KB	CERAMIC 50V 0.01U	1	
C2523		ECKF1H103KB	CERAMIC 50V 0.01U	1	
C2524		ECKF1H103KB	CERAMIC 50V 0.01U	1	
C2525		ECKF1H102KB	CERAMIC 50V 1000P	1	
C2526		ECKF1H103KB	CERAMIC 50V 0.01U	1	
C2527		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2528		ECKF1H103KB	CERAMIC 50V 0.01U	1	
C2529		ECKF1H103KB	CERAMIC 50V 0.01U	1	
C2530		ECKF1H103KB	CERAMIC 50V 0.01U	1	
C2531		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2532		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2533		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2534		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2535		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2536		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2537		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2551		ECCF1H100DC	CERAMIC 50V 10P	1	
C2552		ECCF1H390JC	CERAMIC 50V 39P	1	
C2553		ECKF1H561KB	CERAMIC 50V 560P	1	
C2554		ECQM1H102JV	MYLAR 50V 1000P	1	
C2555		ECKF1H331KB	CERAMIC 50V 330P	1	
C2556		ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C2557		ECKF1H102KB	CERAMIC 50V 1000P	1	
C2558		ECQP1H104GZ	MYLAR 50V 0.1U	1	
C2559		ECQM1H563JV	MYLAR 50V 0.056U	1	
C2560		ECKF1H561KB	CERAMIC 50V 560P	1	
C2561		ECKF1H272KB	CERAMIC 50V 2700P	1	
D201		MA151K	DIODE	1	<R>
D202		MA151K	DIODE	1	<R>
D251		MA151A	DIODE	1	<R>
D252		MA151A	DIODE	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
D253		MA151A	DIODE	1	<R>
D254		MA151A	DIODE	1	<R>
D255		MA151A	DIODE	1	<R>
D2003		MA165	DIODE	1	<R>
D2004		MA165	DIODE	1	<R>
D2005		MA165	DIODE	1	<R>
D2006		MA165	DIODE	1	<R>
D2007		MA165	DIODE	1	<R>
D2008		MA165	DIODE	1	<R>
D2009		10E1	DIODE	1	<R>
D2010		10E1	DIODE	1	<R>
D2011		10E1	DIODE	1	<R>
D2012		MA165	DIODE	1	<R>
D2013		MA165	DIODE	1	<R>
D2014		MA165	DIODE	1	<R>
D2015		MA165	DIODE	1	<R>
D2016		MA165	DIODE	1	<R>
D2017		MA165	DIODE	1	<R>
D2018		MA165	DIODE	1	<R>
D2019		MA165	DIODE	1	<R>
D2032		RD6.2EB	ZENER 6.2V	1	<R>
D2040		MA165	DIODE	1	<R>
D2041		MA165	DIODE	1	<R>
D2042		MA165	DIODE	1	<R>
D2043		MA165	DIODE	1	<R>
D2044		MA165	DIODE	1	<R>
D2045		MA165	DIODE	1	<R>
D2047		MA165	DIODE	1	<R>
D2048		MA165	DIODE	1	<R>
D2049		MA165	DIODE	1	<R>
D2050		MA165	DIODE	1	<R>
D2051		MA165	DIODE	1	<R>
D2052		MA165	DIODE	1	<R>
D2053		MA165	DIODE	1	<R>
D2054		MA165	DIODE	1	<R>
D2055		MA165	DIODE	1	<R>
D2056		MA165	DIODE	1	<R>
D2057		MA165	DIODE	1	<R>
D2058		MA165	DIODE	1	<R>
D2059		MA165	DIODE	1	<R>
D2060		MA165	DIODE	1	<R>
D2061		MA165	DIODE	1	<R>
D2062		MA165	DIODE	1	<R>
D2063		MA165	DIODE	1	<R>
D2064		MA165	DIODE	1	<R>
D2065		MA165	DIODE	1	<R>
D2072		MA165	DIODE	1	<R>
D2073		MA165	DIODE	1	<R>
D2074		MA165	DIODE	1	<R>
D2077		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D2501		MA165	DIODE	1	<R>
D2502		MA165	DIODE	1	<R>
D2503		MA165	DIODE	1	<R>
D2504		MA165	DIODE	1	<R>
D2506		MA165	DIODE	1	<R>
D2507		MA165	DIODE	1	<R>
D2508		MA165	DIODE	1	<R>
D2551		MA165	DIODE	1	<R>
D2552		MA165	DIODE	1	<R>
D2553		MA165	DIODE	1	<R>
D2554		MA165	DIODE	1	<R>
D2555		MA165	DIODE	1	<R>
D2556		MA165	DIODE	1	<R>
D2557		MA165	DIODE	1	<R>
IC201		UPD4040BC	IC	1	<R>
IC202		UPD4011BC	IC	1	<R>
IC203		UPD4023BC	IC	1	<R>
IC204		UPD4069UBC	IC	1	<R>
IC251		UPD4013BC	IC	1	<R>
IC252		BA222	IC	1	<R>
IC253		AN6914	IC	1	<R>
IC2001		UPD1511AC092	IC	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
IC2002		UPD1511AC103	IC	1	<R>
IC2003		UPC339C	IC	1	<R>
IC2004		UPD4013BC	IC	1	<R>
IC2005		UPD4071BC	IC	1	<R>
IC2006		AN6357N	IC	1	<R>
IC2007		AN6346N	IC	1	<R>
IC2008		MN6168VIA	IC	1	<R>
IC2009		AN640G	IC	1	<R>
IC2010		UPC358C	IC	1	<R>
IC2011		UPC358C	IC	1	<R>
IC2012		UPC393C	IC	1	<R>
IC2013		UPD4013BC	IC	1	<R>
IC2014		NJM4556D	IC	1	<R>
IC2015		UPD4053BC	IC	1	<R>
IC2016		UPD4030BC	IC	1	<R>
IC2017		UPD4066BC	IC	1	<R>
IC2018		UPD4053BC	IC	1	<R>
IC2019		UPD4001BC	IC	1	<R>
IC2020		UPD4030BC	IC	1	<R>
IC2021		UPD4066BC	IC	1	<R>
IC2022		UPD4516BC	IC	1	<R>
IC2023		UPD4516BC	IC	1	<R>
IC2024		AN6677	IC	1	<R>
IC2025		UPD4538BC	IC	1	<R>
IC2026		AN6913	IC	1	<R>
IC2027		UPD4013BC	IC	1	<R>
IC2028		UPD4013BC	IC	1	<R>
IC2029		UPC339C	IC	1	<R>
IC2030		BA236B	IC	1	<R>
IC2031		UPD4075BC	IC	1	<R>
IC2032		UPC4082C	IC	1	<R>
IC2033		UPC339C	IC	1	<R>
IC2034		AN6342N	IC	1	<R>
IC2035		UPD4013BC	IC	1	<R>
IC2036		UPD4066BC	IC	1	<R>
IC2037		AN78N12	IC	1	<R>
IC2038		AN78N12	IC	1	<R>
IC2039		UPC339C	IC	1	<R>
IC2040		BA6302A	IC	1	<R>
IC2041		AN78L05	IC	1	<R>
IC2042		UPD4066BC	IC	1	<R>
IC2501		UPD4538BC	IC	1	<R>
IC2502		UPD4040BC	IC	1	<R>
IC2503		UPC4556C	IC	1	<R>
IC2504		UPC393C	IC	1	<R>
IC2505		UPD4013BC	IC	1	<R>
IC2506		UPD4538BC	IC	1	<R>
IC2507		UPD4040BC	IC	1	<R>
IC2508		UPD1511AC108	IC	1	<R>
IC2509		UPD4013BC	IC	1	<R>
IC2510		UPD4538BC	IC	1	<R>
IC2511		UPD4013BC	IC	1	<R>
IC2512		UPD4066BC	IC	1	<R>
IC2551		UPD4013BC	IC	1	<R>
IC2552		BA222	IC	1	<R>
IC2553		AN6914	IC	1	<R>
L251		VLQEL05F221K	COIL 220UH	1	
L2001		VLQEL05F470K	COIL 47UH	1	
L2002		VLQEL06F102K	COIL 1UH	1	
L2004		VLQEL05F470K	COIL 47UH	1	
L2005		VLQEL06F102K	COIL 1UH	1	
L2006		VLQEL06F102K	COIL 1UH	1	
L2501		VLQEL05F470K	COIL 47UH	1	
L2551		VLQEL05F221K	COIL 220UH	1	
P001		VJP1238T	CONNECTOR (MALE) 11P	1	
P2001		VJP1234R	CONNECTOR (MALE) 7P	1	
P2002		VJP1230G	CONNECTOR (MALE) 3P	1	
P2003		VJP1234T	CONNECTOR (MALE) 7P	1	
P2004		VJP1235T	CONNECTOR (MALE) 8P	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
P2005		VJP1235R	CONNECTOR(MALE) 8P	1	
P2006		VJP1233T	CONNECTOR(MALE) 6P	1	
P2007		VJP1231T	CONNECTOR(MALE) 4P	1	
P2008		VJP1229T	CONNECTOR(MALE) 2P	1	
P2009		VJP1229	CONNECTOR(MALE) 2P	1	
P2010		VJP1229T	CONNECTOR(MALE) 2P	1	
P2011		VJP1229	CONNECTOR(MALE) 2P	1	
P2012		VJP1230T	CONNECTOR(MALE) 3P	1	
P2013		VJP1229	CONNECTOR(MALE) 2P	1	
P2014		VJP1231G	CONNECTOR(MALE) 4P	1	
P2015		VJP1229	CONNECTOR(MALE) 2P	1	
P2016		VJP1229T	CONNECTOR(MALE) 2P	1	
P2017		VJP1232T	CONNECTOR(MALE) 5P	1	
P2018		VJP1229T	CONNECTOR(MALE) 2P	1	
P2019		VJP1243T	CONNECTOR(MALE) 3P	1	
Q251		2SD601	TRANSISTOR CHIP	1	(Q,R)<R>
Q2001		2SC3311	TRANSISTOR	1	(Q,R)<R>
Q2002		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2003		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2005		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2006		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2007		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2008		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2009		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2010		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2011		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2012		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2013		2SD637	TRANSISTOR	1	(Q,R)<R>
Q2014		2SB941	TRANSISTOR	1	(P,Q)<!><R>
Q2015		2SD637	TRANSISTOR	1	(Q,R)<R>
Q2016		2SB941	TRANSISTOR	1	(P,Q)<!><R>
Q2017		2SD637	TRANSISTOR	1	(Q,R)<R>
Q2018		2SB941	TRANSISTOR	1	(P,Q)<!><R>
Q2019		2SD1266	TRANSISTOR	1	(P,Q)<!><R>
Q2020		2SD1266	TRANSISTOR	1	(P,Q)<!><R>
Q2021		2SD1266	TRANSISTOR	1	(P,Q)<!><R>
Q2022		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2023		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2024		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2025		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2026		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2027		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2028		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2029		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2030		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2031		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2032		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2033		2SB643	TRANSISTOR	1	(Q,R)<R>
Q2034		2SD638	TRANSISTOR	1	(Q,R)<R>
Q2035		2SD1266	TRANSISTOR	1	(P,Q)<!><R>
Q2036		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2037		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2038		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2039		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2040		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2041		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2042		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2043		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2044		2SD889	TRANSISTOR	1	(P,Q,R)<R>
Q2045		2SD889	TRANSISTOR	1	(P,Q,R)<R>
Q2046		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2047		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2048		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2050		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2051		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2052		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2053		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2054		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2055		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2056		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2057		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2058		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2059		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2060		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2501		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2502		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2551		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2552		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2553		2SD889	TRANSISTOR	1	(P,Q,R)<R>
Q2554		2SD889	TRANSISTOR	1	(P,Q,R)<R>
Q2555		2SD636	TRANSISTOR	1	(Q,R)<R>
QR2001		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2002		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2003		UN1215	TRANSISTOR-RESISTOR	1	<R>
QR2004		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2005		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR2007		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR2008		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2009		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2010		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2011		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2012		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2013		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2014		UN1212	TRANSISTOR-RESISTOR	1	<R>
QR2015		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR2016		UN1212	TRANSISTOR-RESISTOR	1	<R>
QR2017		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2018		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2019		UN1113	TRANSISTOR-RESISTOR	1	<R>
QR2025		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2026		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2027		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2028		UN1215	TRANSISTOR-RESISTOR	1	<R>
QR2029		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2030		UN1212	TRANSISTOR-RESISTOR	1	<R>
QR2031		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2032		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2033		UN1212	TRANSISTOR-RESISTOR	1	<R>
QR2034		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2035		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2036		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2037		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2038		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2049		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR2050		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2051		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2501		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2502		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2503		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2504		UN1212	TRANSISTOR-RESISTOR	1	<R>
QR2505		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2506		UN1112	TRANSISTOR-RESISTOR	1	<R>
			RESISTORS		
R201		ERJ6GEYJ105	CHIP 1/16W 1M	1	
R202		ERJ6GEYJ105	CHIP 1/16W 1M	1	
R203		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R204		ERJ6GEYJ104	CHIP 1/16W 100K	1	
R205		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R206		ERJ6GEYJ104	CHIP 1/16W 100K	1	
R207		ERJ6GEYJ105	CHIP 1/16W 1M	1	
R208		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R209		ERJ6GEYJ105	CHIP 1/16W 1M	1	
R210		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R211		ERJ6GEYJ104	CHIP 1/16W 100K	1	
R212		ERJ6GEYJ104	CHIP 1/16W 100K	1	
R251		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R252		ERJ6GEYJ273	CHIP 1/16W 27K	1	
R253		ERJ6GEYJ224	CHIP 1/16W 220K	1	
R254		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R255		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R256		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R257		ERJ6GEYJ105	CHIP 1/16W 1M	1	
R258		ERJ6GEYJ393	CHIP 1/16W 39K	1	
R259		ERJ6GEYJ103	CHIP 1/16W 10K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R260		ERJ6GEYJ104	CHIP 1/16W 100K	1	
R261		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R2001		ERDS2TJ223	CARBON 1/4W 22K	1	
R2002		ERDS2TJ104	CARBON 1/4W 100K	1	
R2003		ERDS2TJ103	CARBON 1/4W 10K	1	
R2004		ERDS2TJ103	CARBON 1/4W 10K	1	
R2005		ERDS2TJ103	CARBON 1/4W 10K	1	
R2006		EROS2CKG1803	METAL OXIDE 1/4W 180K	1	
R2007		ERDS2TJ103	CARBON 1/4W 10K	1	
R2008		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R2009		ERDS2TJ104	CARBON 1/4W 100K	1	
R2010		ERDS2TJ104	CARBON 1/4W 100K	1	
R2011		ERDS2TJ103	CARBON 1/4W 10K	1	
R2012		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R2013		ERDS2TJ104	CARBON 1/4W 100K	1	
R2014		ERDS2TJ104	CARBON 1/4W 100K	1	
R2015		ERDS2TJ473	CARBON 1/4W 47K	1	
R2016		ERDS2TJ103	CARBON 1/4W 10K	1	
R2017		ERDS2TJ473	CARBON 1/4W 47K	1	
R2018		ERDS2TJ104	CARBON 1/4W 100K	1	
R2019		ERDS2TJ563	CARBON 1/4W 56K	1	
R2020		ERDS2TJ104	CARBON 1/4W 100K	1	
R2021		ERDS2TJ104	CARBON 1/4W 100K	1	
R2022		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2023		ERDS2TJ105	CARBON 1/4W 1000K	1	
R2024		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2025		ERDS2TJ104	CARBON 1/4W 100K	1	
R2026		ERDS2TJ104	CARBON 1/4W 100K	1	
R2027		ERDS2TJ563	CARBON 1/4W 56K	1	
R2028		ERDS2TJ103	CARBON 1/4W 10K	1	
R2029		ERDS2TJ103	CARBON 1/4W 10K	1	
R2030		ERDS2TJ473	CARBON 1/4W 47K	1	
R2031		ERDS2TJ473	CARBON 1/4W 47K	1	
R2032		ERDS2TJ563	CARBON 1/4W 56K	1	
R2033		ERDS2TJ473	CARBON 1/4W 47K	1	
R2034		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R2035		ERDS2TJ153	CARBON 1/4W 15K	1	
R2036		ERDS2TJ223	CARBON 1/4W 22K	1	
R2037		ERDS2TJ823	CARBON 1/4W 82K	1	
R2038		ERDS2TJ560	CARBON 1/4W 56	1	
R2039		EROS2CKG1002	METAL OXIDE 1/4W 10K	1	
R2040		EROS2CKG6802	METAL OXIDE 1/4W 68K	1	
R2041		EROS2CKG1202	METAL OXIDE 1/4W 12K	1	
R2042		ERDS2TJ224	CARBON 1/4W 220K	1	
R2043		ERDS2TJ103	CARBON 1/4W 10K	1	
R2044		ERDS2TJ103	CARBON 1/4W 10K	1	
R2045		ERDS2TJ473	CARBON 1/4W 47K	1	
R2046		ERDS2TJ104	CARBON 1/4W 100K	1	
R2047		EROS2CKG5602	METAL OXIDE 1/4W 56K	1	
R2048		EROS2CKG1002	METAL OXIDE 1/4W 10K	1	
R2049		EROS2CKG8200	METAL OXIDE 1/4W 820	1	
R2050		ERDS2TJ471	CARBON 1/4W 470	1	
R2051		ERDS2TJ821	CARBON 1/4W 820	1	
R2052		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2053		ERDS2TJ102	CARBON 1/4W 1K	1	
R2054		ERDS2TJ102	CARBON 1/4W 1K	1	
R2055		ERDS2TJ104	CARBON 1/4W 100K	1	
R2056		EROS2CKG4700	METAL OXIDE 1/4W 470	1	
R2057		ERDS2TJ103	CARBON 1/4W 10K	1	
R2058		ERG12ANJ820	METAL OXIDE 1/2W 82	1	
R2059		ERDS2TJ103	CARBON 1/4W 10K	1	
R2060		ERG12ANJ820	METAL OXIDE 1/2W 82	1	
R2061		ERDS2TJ103	CARBON 1/4W 10K	1	
R2062		ERG12ANJ820	METAL OXIDE 1/2W 82	1	
R2063		ERDS2TJ151	CARBON 1/4W 150	1	
R2064		ERDS2TJ151	CARBON 1/4W 150	1	
R2065		ERDS2TJ151	CARBON 1/4W 150	1	
R2066		ERDS2TJ151	CARBON 1/4W 150	1	
R2067		ERDS2TJ103	CARBON 1/4W 10K	1	
R2068		ERDS2TJ151	CARBON 1/4W 150	1	
R2069		ERDS2TJ103	CARBON 1/4W 10K	1	
R2070		ERDS2TJ151	CARBON 1/4W 150	1	
R2071		ERDS2TJ103	CARBON 1/4W 10K	1	
R2072		ERX1ANJ1R0	METAL OXIDE 1W 1	1	
R2073		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2074		ERDS2TJ333	CARBON 1/4W 33K	1	
R2075		ERDS2TJ333	CARBON 1/4W 33K	1	
R2076		ERDS2TJ102	CARBON 1/4W 1K	1	
R2077		ERDS2TJ471	CARBON 1/4W 470	1	
R2078		ERDS2TJ223	CARBON 1/4W 22K	1	
R2079		ERDS2TJ391	CARBON 1/4W 390	1	
R2080		ERDS2TJ223	CARBON 1/4W 22K	1	
R2081		ERDS2TJ224	CARBON 1/4W 220K	1	
R2082		ERDS2TJ391	CARBON 1/4W 390	1	
R2083		ERDS2TJ223	CARBON 1/4W 22K	1	
R2084		ERDS2TJ471	CARBON 1/4W 470	1	
R2085		ERDS2TJ223	CARBON 1/4W 22K	1	
R2086		ERDS2TJ224	CARBON 1/4W 220K	1	
R2087		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R2088		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R2089		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R2090		ERDS2TJ103	CARBON 1/4W 10K	1	
R2091		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R2092		ERDS2TJ103	CARBON 1/4W 10K	1	
R2093		ERDS2TJ470	CARBON 1/4W 47	1	
R2094		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R2095		ERDS2TJ103	CARBON 1/4W 10K	1	
R2096		ERDS2TJ103	CARBON 1/4W 10K	1	
R2097		ERDS2TJ563	CARBON 1/4W 56K	1	
R2098		ERDS2TJ123	CARBON 1/4W 12K	1	
R2099		ERDS2TJ333	CARBON 1/4W 33K	1	
R2100		ERDS2TJ393	CARBON 1/4W 39K	1	
R2101		ERDS2TJ823	CARBON 1/4W 82K	1	
R2103		ERDS2TJ683	CARBON 1/4W 68K	1	
R2104		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2105		ERDS2TJ102	CARBON 1/4W 1K	1	
R2106		ERDS2TJ333	CARBON 1/4W 33K	1	
R2107		ERDS2TJ563	CARBON 1/4W 56K	1	
R2108		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R2109		ERDS2TJ121	CARBON 1/4W 120	1	
R2110		ERDS2TJ102	CARBON 1/4W 1K	1	
R2111		ERDS2TJ102	CARBON 1/4W 1K	1	
R2112		ERDS2TJ333	CARBON 1/4W 33K	1	
R2113		ERDS2TJ223	CARBON 1/4W 22K	1	
R2114		ERDS2TJ394	CARBON 1/4W 390K	1	
R2115		ERDS2TJ151	CARBON 1/4W 150	1	
R2116		ERDS2TJ105	CARBON 1/4W 1000K	1	
R2117		ERDS2TJ333	CARBON 1/4W 33K	1	
R2118		ERDS2TJ103	CARBON 1/4W 10K	1	
R2119		ERDS2TJ154	CARBON 1/4W 150K	1	
R2120		ERDS2TJ184	CARBON 1/4W 180K	1	
R2121		ERDS2TJ103	CARBON 1/4W 10K	1	
R2122		ERDS2TJ563	CARBON 1/4W 56K	1	
R2123		ERDS2TJ563	CARBON 1/4W 56K	1	
R2124		ERDS2TJ103	CARBON 1/4W 10K	1	
R2125		ERDS2TJ102	CARBON 1/4W 1K	1	
R2126		ERDS2TJ823	CARBON 1/4W 82K	1	
R2127		ERDS2TJ333	CARBON 1/4W 33K	1	
R2128		ERDS2TJ333	CARBON 1/4W 33K	1	
R2129		ERDS2TJ104	CARBON 1/4W 100K	1	
R2130		ERDS2TJ104	CARBON 1/4W 100K	1	
R2140		ERDS2TJ103	CARBON 1/4W 10K	1	
R2141		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R2142		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R2143		ERDS2TJ123	CARBON 1/4W 12K	1	
R2144		ERDS2TJ103	CARBON 1/4W 10K	1	
R2145		ERDS2TJ103	CARBON 1/4W 10K	1	
R2146		ERDS2TJ124	CARBON 1/4W 120K	1	
R2147		ERDS2TJ561	CARBON 1/4W 560	1	
R2148		ERDS2TJ473	CARBON 1/4W 47K	1	
R2151		ERDS2TJ183	CARBON 1/4W 18K	1	
R2153		ERDS2TJ103	CARBON 1/4W 10K	1	
R2154		ERDS2TJ103	CARBON 1/4W 10K	1	
R2156		ERDS2TJ104	CARBON 1/4W 100K	1	
R2157		ERDS2TJ681	CARBON 1/4W 680	1	
R2158		ERDS2TJ151	CARBON 1/4W 150	1	
R2159		ERDS2TJ103	CARBON 1/4W 10K	1	
R2160		ERDS2TJ223	CARBON 1/4W 22K	1	
R2161		ERDS2TJ103	CARBON 1/4W 10K	1	
R2162		ERDS2TJ103	CARBON 1/4W 10K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R2163		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R2165		ERDS2TJ103	CARBON 1/4W 10K	1	
R2168		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2169		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2170		ERDS2TJ563	CARBON 1/4W 56K	1	
R2171		ERDS2TJ563	CARBON 1/4W 56K	1	
R2172		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2173		EROS2CKG2403	METAL OXIDE 1/4W 240K	1	
R2174		ERDS2TJ104	CARBON 1/4W 100K	1	
R2175		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2176		ERDS2TJ104	CARBON 1/4W 100K	1	
R2177		ERDS2TJ103	CARBON 1/4W 10K	1	
R2178		ERDS2TJ102	CARBON 1/4W 1K	1	
R2179		ERDS2TJ153	CARBON 1/4W 15K	1	
R2180		ERDS2TJ274	CARBON 1/4W 270K	1	
R2181		ERDS2TJ104	CARBON 1/4W 100K	1	
R2182		ERDS2TJ103	CARBON 1/4W 10K	1	
R2183		ERDS2TJ103	CARBON 1/4W 10K	1	
R2190		ERX12ANJ1R0	METAL OXIDE 1/2W 1	1	
R2191		ERDS2TJ470	CARBON 1/4W 47	1	
R2192		ERDS2TJ470	CARBON 1/4W 47	1	
R2193		ERDS2TJ470	CARBON 1/4W 47	1	
R2194		ERDS2TJ224	CARBON 1/4W 220K	1	
R2195		ERDS2TJ153	CARBON 1/4W 15K	1	
R2196		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2197		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R2198		ERDS2TJ103	CARBON 1/4W 10K	1	
R2199		ERDS2TJ103	CARBON 1/4W 10K	1	
R2200		ERDS2TJ183	CARBON 1/4W 18K	1	
R2201		ERDS2TJ154	CARBON 1/4W 150K	1	
R2202		ERDS2TJ154	CARBON 1/4W 150K	1	
R2203		ERDS2TJ224	CARBON 1/4W 220K	1	
R2204		ERDS2TJ333	CARBON 1/4W 33K	1	
R2205		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R2206		ERDS2TJ333	CARBON 1/4W 33K	1	
R2207		ERDS2TJ103	CARBON 1/4W 10K	1	
R2208		ERDS2TJ683	CARBON 1/4W 68K	1	
R2209		ERDS2TJ333	CARBON 1/4W 33K	1	
R2210		ERDS2TJ103	CARBON 1/4W 10K	1	
R2211		ERDS2TJ103	CARBON 1/4W 10K	1	
R2212		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R2213		ERDS2TJ823	CARBON 1/4W 82K	1	
R2214		ERDS2TJ103	CARBON 1/4W 10K	1	
R2215		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R2216		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R2217		ERDS2TJ333	CARBON 1/4W 33K	1	
R2218		ERDS2TJ103	CARBON 1/4W 10K	1	
R2219		ERDS2TJ103	CARBON 1/4W 10K	1	
R2220		ERDS2TJ104	CARBON 1/4W 100K	1	
R2221		ERDS2TJ103	CARBON 1/4W 10K	1	
R2222		ERDS2TJ103	CARBON 1/4W 10K	1	
R2223		ERDS2TJ103	CARBON 1/4W 10K	1	
R2224		ERDS2TJ563	CARBON 1/4W 56K	1	
R2225		ERDS2TJ104	CARBON 1/4W 100K	1	
R2226		ERDS2TJ103	CARBON 1/4W 10K	1	
R2227		ERDS2TJ103	CARBON 1/4W 10K	1	
R2230		ERDS2TJ102	CARBON 1/4W 1K	1	
R2231		ERDS2TJ333	CARBON 1/4W 33K	1	
R2232		ERDS2TJ333	CARBON 1/4W 33K	1	
R2233		ERDS2TJ473	CARBON 1/4W 47K	1	
R2234		ERD25TJ395	CARBON 1/4W 3.9M	1	
R2235		ERDS2TJ102	CARBON 1/4W 1K	1	
R2236		ERDS2TJ104	CARBON 1/4W 100K	1	
R2237		ERDS2TJ103	CARBON 1/4W 10K	1	
R2238		ERDS2TJ104	CARBON 1/4W 100K	1	
R2239		ERDS2TJ333	CARBON 1/4W 33K	1	
R2240		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2241		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2242		ERDS2TJ184	CARBON 1/4W 180K	1	
R2243		ERDS2TJ104	CARBON 1/4W 100K	1	
R2244		ERDS2TJ104	CARBON 1/4W 100K	1	
R2245		ERDS2TJ473	CARBON 1/4W 47K	1	
R2246		ERDS2TJ105	CARBON 1/4W 1000K	1	
R2247		ERDS2TJ104	CARBON 1/4W 100K	1	
R2248		ERDS2TJ274	CARBON 1/4W 270K	1	
R2249		ERDS2TJ274	CARBON 1/4W 270K	1	
R2251		ERDS2TJ104	CARBON 1/4W 100K	1	
R2252		ERDS2TJ103	CARBON 1/4W 10K	1	
R2258		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2260		ERDS2TJ153	CARBON 1/4W 15K	1	
R2261		ERDS2TJ154	CARBON 1/4W 150K	1	
R2262		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2264		ERDS2TJ103	CARBON 1/4W 10K	1	
R2265		ERDS2TJ104	CARBON 1/4W 100K	1	
R2266		ERDS2TJ104	CARBON 1/4W 100K	1	
R2267		ERDS2TJ224	CARBON 1/4W 220K	1	
R2268		ERDS2TJ103	CARBON 1/4W 10K	1	
R2269		ERDS2TJ124	CARBON 1/4W 120K	1	
R2270		ERDS2TJ104	CARBON 1/4W 100K	1	
R2275		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2276		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2277		ERDS2TJ224	CARBON 1/4W 220K	1	
R2278		ERDS2TJ103	CARBON 1/4W 10K	1	
R2279		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R2280		ERDS2TJ154	CARBON 1/4W 150K	1	
R2281		ERDS2TJ103	CARBON 1/4W 10K	1	
R2282		ERDS2TJ103	CARBON 1/4W 10K	1	
R2283		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2284		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2286		ERDS2TJ274	CARBON 1/4W 270K	1	
R2287		ERDS2TJ223	CARBON 1/4W 22K	1	
R2288		ERDS2TJ103	CARBON 1/4W 10K	1	
R2289		ERDS2TJ103	CARBON 1/4W 10K	1	
R2290		ERDS2TJ224	CARBON 1/4W 220K	1	
R2291		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R2292		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2293		ERDS2TJ223	CARBON 1/4W 22K	1	
R2296		ERDS2TJ223	CARBON 1/4W 22K	1	
R2297		ERDS2TJ223	CARBON 1/4W 22K	1	
R2300		ERDS2TJ103	CARBON 1/4W 10K	1	
R2302		ERDS2TJ103	CARBON 1/4W 10K	1	
R2303		ERDS2TJ104	CARBON 1/4W 100K	1	
R2304		ERDS2TJ473	CARBON 1/4W 47K	1	
R2305		ERDS2TJ104	CARBON 1/4W 100K	1	
R2306		ERDS2TJ103	CARBON 1/4W 10K	1	
R2307		ERDS2TJ333	CARBON 1/4W 33K	1	
R2308		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2309		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2310		ERDS2TJ102	CARBON 1/4W 1K	1	
R2311		ERD25TJ395	CARBON 1/4W 3.9M	1	
R2312		ERDS2TJ104	CARBON 1/4W 100K	1	
R2313		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2314		ERDS2TJ224	CARBON 1/4W 220K	1	
R2315		ERDS2TJ102	CARBON 1/4W 1K	1	
R2316		ERDS2TJ224	CARBON 1/4W 220K	1	
R2317		ERDS2TJ224	CARBON 1/4W 220K	1	
R2318		ERDS2TJ224	CARBON 1/4W 220K	1	
R2319		ERDS2TJ102	CARBON 1/4W 1K	1	
R2320		ERDS2TJ103	CARBON 1/4W 10K	1	
R2321		ERDS2TJ103	CARBON 1/4W 10K	1	
R2322		ERDS2TJ331	CARBON 1/4W 330	1	
R2323		ERDS2TJ103	CARBON 1/4W 10K	1	
R2324		ERDS2TJ331	CARBON 1/4W 330	1	
R2325		ERDS2TJ274	CARBON 1/4W 270K	1	
R2326		ERDS2TJ274	CARBON 1/4W 270K	1	
R2327		ERDS2TJ274	CARBON 1/4W 270K	1	
R2328		ERDS2TJ274	CARBON 1/4W 270K	1	
R2329		ERDS2TJ104	CARBON 1/4W 100K	1	
R2330		ERDS2TJ333	CARBON 1/4W 33K	1	
R2331		ERDS2TJ105	CARBON 1/4W 1000K	1	
R2332		ERDS2TJ224	CARBON 1/4W 220K	1	
R2333		ERDS2TJ105	CARBON 1/4W 1000K	1	
R2334		ERDS2TJ103	CARBON 1/4W 10K	1	
R2335		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R2336		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R2337		ERDS2TJ224	CARBON 1/4W 220K	1	
R2338		ERDS2TJ104	CARBON 1/4W 100K	1	
R2339		ERDS2TJ103	CARBON 1/4W 10K	1	
R2340		ERDS2TJ104	CARBON 1/4W 100K	1	
R2341		ERDS2TJ104	CARBON 1/4W 100K	1	
R2342		ERDS2TJ104	CARBON 1/4W 100K	1	
R2343		ERDS2TJ103	CARBON 1/4W 10K	1	
R2344		ERDS2TJ102	CARBON 1/4W 1K	1	
R2345		ERDS2TJ102	CARBON 1/4W 1K	1	
R2350		ERDS2TJ104	CARBON 1/4W 100K	1	
R2351		ERDS2TJ103	CARBON 1/4W 10K	1	
R2352		ERDS2TJ105	CARBON 1/4W 1000K	1	
R2353		EROS2CKG3302	METAL OXIDE 1/4W 33K	1	
R2354		ERDS2TJ104	CARBON 1/4W 100K	1	
R2355		ERDS2TJ103	CARBON 1/4W 10K	1	
R2356		ERDS2TJ103	CARBON 1/4W 10K	1	
R2357		ERDS2TJ473	CARBON 1/4W 47K	1	
R2358		ERDS2TJ103	CARBON 1/4W 10K	1	
R2359		ERDS2TJ104	CARBON 1/4W 100K	1	
R2360		ERDS2TJ104	CARBON 1/4W 100K	1	
R2361		ERDS2TJ103	CARBON 1/4W 10K	1	
R2362		ERDS2TJ104	CARBON 1/4W 100K	1	
R2363		ERDS2TJ394	CARBON 1/4W 390K	1	
R2364		ERQ12HJ1R5	FUSE 1/2W 1.5	1	
R2365		ERQ12HJ1R5	FUSE 1/2W 1.5	1	
R2367		ERDS2TJ103	CARBON 1/4W 10K	1	
R2368		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2369		ERDS2TJ684	CARBON 1/4W 680K	1	
R2370		ERDS2TJ104	CARBON 1/4W 100K	1	
R2371		ERDS2TJ563	CARBON 1/4W 56K	1	
R2372		ERDS2TJ822	CARBON 1/4W 8.2K	1	
R2373		ERDS2TJ104	CARBON 1/4W 100K	1	
R2374		ERDS2TJ561	CARBON 1/4W 560	1	
R2375		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2376		ERSB27J102	THERMISTOR	1	
R2377		ERDS2TJ103	CARBON 1/4W 10K	1	
R2501		ERDS2TJ103	CARBON 1/4W 10K	1	
R2502		ERDS2TJ473	CARBON 1/4W 47K	1	
R2503		ERDS2TJ473	CARBON 1/4W 47K	1	
R2504		ERDS2TJ563	CARBON 1/4W 56K	1	
R2505		ERDS2TJ102	CARBON 1/4W 1K	1	
R2506		ERDS2TJ102	CARBON 1/4W 1K	1	
R2507		ERDS2TJ104	CARBON 1/4W 100K	1	
R2508		ERDS2TJ102	CARBON 1/4W 1K	1	
R2509		ERDS2TJ224	CARBON 1/4W 220K	1	
R2510		ERDS2TJ103	CARBON 1/4W 10K	1	
R2511		ERDS2TJ104	CARBON 1/4W 100K	1	
R2512		ERDS2TJ124	CARBON 1/4W 120K	1	
R2513		ERDS2TJ104	CARBON 1/4W 100K	1	
R2514		ERDS2TJ103	CARBON 1/4W 10K	1	
R2515		ERDS2TJ473	CARBON 1/4W 47K	1	
R2516		ERDS2TJ563	CARBON 1/4W 56K	1	
R2517		ERDS2TJ124	CARBON 1/4W 120K	1	
R2518		ERDS2TJ104	CARBON 1/4W 100K	1	
R2521		ERDS2TJ103	CARBON 1/4W 10K	1	
R2522		ERDS2TJ104	CARBON 1/4W 100K	1	
R2523		ERDS2TJ103	CARBON 1/4W 10K	1	
R2524		ERDS2TJ124	CARBON 1/4W 120K	1	
R2525		ERDS2TJ104	CARBON 1/4W 100K	1	
R2526		ERDS2TJ154	CARBON 1/4W 150K	1	
R2527		ERDS2TJ104	CARBON 1/4W 100K	1	
R2528		ERDS2TJ103	CARBON 1/4W 10K	1	
R2529		ERDS2TJ103	CARBON 1/4W 10K	1	
R2530		ERDS2TJ103	CARBON 1/4W 10K	1	
R2531		ERDS2TJ103	CARBON 1/4W 10K	1	
R2532		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2533		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R2534		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2535		ERDS2TJ104	CARBON 1/4W 100K	1	
R2536		ERDS2TJ103	CARBON 1/4W 10K	1	
R2537		ERDS2TJ154	CARBON 1/4W 150K	1	
R2538		ERDS2TJ154	CARBON 1/4W 150K	1	
R2539		ERDS2TJ104	CARBON 1/4W 100K	1	
R2540		ERDS2TJ104	CARBON 1/4W 100K	1	
R2541		ERDS2TJ224	CARBON 1/4W 220K	1	
R2542		ERDS2TJ104	CARBON 1/4W 100K	1	
R2543		ERDS2TJ224	CARBON 1/4W 220K	1	
R2544		ERDS2TJ684	CARBON 1/4W 680K	1	
R2545		ERDS2TJ224	CARBON 1/4W 220K	1	
R2546		ERDS2TJ561	CARBON 1/4W 560	1	
R2547		ERDS2TJ224	CARBON 1/4W 220K	1	
R2548		ERDS2TJ473	CARBON 1/4W 47K	1	
R2549		ERDS2TJ103	CARBON 1/4W 10K	1	
R2550		ERDS2TJ474	CARBON 1/4W 470K	1	
R2551		ERDS2TJ103	CARBON 1/4W 10K	1	
R2552		ERDS2TJ273	CARBON 1/4W 27K	1	
R2553		ERDS2TJ224	CARBON 1/4W 220K	1	
R2554		ERDS2TJ103	CARBON 1/4W 10K	1	
R2555		ERDS2TJ103	CARBON 1/4W 10K	1	
R2556		ERDS2TJ103	CARBON 1/4W 10K	1	
R2557		ERDS2TJ105	CARBON 1/4W 1000K	1	
R2558		ERDS2TJ393	CARBON 1/4W 39K	1	
R2559		ERDS2TJ103	CARBON 1/4W 10K	1	
R2560		ERDS2TJ104	CARBON 1/4W 100K	1	
R2561		ERDS2TJ103	CARBON 1/4W 10K	1	
R2562		ERDS2TJ104	CARBON 1/4W 100K	1	
R2563		ERDS2TJ104	CARBON 1/4W 100K	1	
R2564		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R2565		ERDS2TJ563	CARBON 1/4W 56K	1	
R2566		ERDS2TJ563	CARBON 1/4W 56K	1	
R2567		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2568		EROS2CKG2403	METAL OXIDE 1/4W 240K	1	
R2569		ERDS2TJ104	CARBON 1/4W 100K	1	
R2570		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2571		ERDS2TJ104	CARBON 1/4W 100K	1	
R2572		ERDS2TJ103	CARBON 1/4W 10K	1	
R2573		ERDS2TJ474	CARBON 1/4W 470K	1	
RA2001		EXBP84103K	RESISTOR&RESISTOR 10K	1	
RA2002		EXBP84103K	RESISTOR&RESISTOR 10K	1	
RA2003		EXBP87103K	RESISTOR&RESISTOR 10K	1	
RA2004		EXBP87103K	RESISTOR&RESISTOR 10K	1	
VR2001		EVM38GA00B54	VARIABLE 50K	1	
VR2002		EVM38GA00B25	VARIABLE 200K	1	
VR2007		EVM38GA00B54	VARIABLE 50K	1	
VR2008		EVM38GA00B54	VARIABLE 50K	1	
VR2011		EVM38GA00B24	VARIABLE 20K	1	
VR2012		EVM38GA00B24	VARIABLE 20K	1	
X201		VSX0083	CRYSTAL OSCILLATOR	1	
X2001		VSX0128	CRYSTAL OSCILLATOR	1	
X2002		VSX0128	CRYSTAL OSCILLATOR	1	
X2501		VSX0128	CRYSTAL OSCILLATOR	1	
			MISCELLANEOUS		
		VSC0495	HEAT SINK	2	
		VMX1028	SUPPORT	2	
		VMX0985	SPACER	1	
		VKC0129	HINGE	2	
		VJR0128	PACK PIN 5P	1	
		VJR0160	PACK PIN 6P	1	
		VJR0161	PACK PIN	1	
	■	VEP02224B	REEL SERVO C.B.A.		
			CAPACITORS		
C2701		ECKF1H561KB	CERAMIC 50V 560P	1	
C2702		ECQM1H333JV	MYLAR 50V 0.033U	1	
C2703		ECKF1H561KB	CERAMIC 50V 560P	1	
C2704		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C2705		ECEA1HKR47	ELECTROLYTIC 50V 0.47U	1	
C2706		ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C2707		ECQM1H333JV	MYLAR 50V 0.033U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C2708		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2709		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C2710		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C2711		ECEA1HKR47	ELECTROLYTIC 50V 0.47U	1	
C2712		ECEA0JU102	ELECTROLYTIC 6.3V 1000U	1	
C2713		ECQM1H823JV	MYLAR 50V 0.082U	1	
C2714		ECQM1H123JV	MYLAR 50V 0.012U	1	
C2715		ECEA1CKN220	ELECTROLYTIC 16V 22U	1	
C2716		ECQM1H823JV	MYLAR 50V 0.082U	1	
C2717		ECQM1H222JV	MYLAR 50V 2200P	1	
C2718		ECEA1CKN100	ELECTROLYTIC 16V 10U	1	
C2719		ECQM1H823JV	MYLAR 50V 0.082U	1	
C2720		ECQM1H222JV	MYLAR 50V 2200P	1	
C2721		ECEA1CN470S	ELECTROLYTIC 16V 47U	1	
C2722		ECQM1H103JV	MYLAR 50V 0.01U	1	
C2723		ECKF1H182KB	CERAMIC 50V 1800P	1	
C2724		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2726		ECEA1EU221	ELECTROLYTIC 25V 220U	1	
C2727		ECQM1H103JV	MYLAR 50V 0.01U	1	
C2728		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2729		ECQV1H154JZ	MYLAR 50V 0.15U	1	
C2730		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2732		ECEA1EU221	ELECTROLYTIC 25V 220U	1	
C2733		ECQM1H103JV	MYLAR 50V 0.01U	1	
C2734		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2735		ECQV1H154JZ	MYLAR 50V 0.15U	1	
C2736		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2737		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2738		ECCF1H680JC	CERAMIC 50V 68P	1	
C2739		ECCF1H680KC	CERAMIC 50V 68P	1	
C2740		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C2741		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2742		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C2743		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C2744		ECEA1EU331	ELECTROLYTIC 25V 330U	1	
C2745		ECEA1EU331	ELECTROLYTIC 25V 330U	1	
C2746		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2747		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2751		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2752		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2753		ECEA1HKR47	ELECTROLYTIC 50V 0.47U	1	
C2754		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C2755		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2756		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2757		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2758		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2759		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2760		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2766		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C2767		ECEA1VU470	ELECTROLYTIC 35V 47U	1	
D2701		MA165	DIODE	1	<R>
D2701		MA165	DIODE	1	<R>
D2703		MA165	DIODE	1	<R>
D2704		MA165	DIODE	1	<R>
D2705		MA165	DIODE	1	<R>
D2706		MA165	DIODE	1	<R>
D2707		ERA81004G	DIODE	1	<R>
D2708		ERA81004G	DIODE	1	<R>
D2709		MA165	DIODE	1	<R>
D2710		MA165	DIODE	1	<R>
D2711		MA165	DIODE	1	<R>
D2712		MA165	DIODE	1	<R>
D2713		MA165	DIODE	1	<R>
D2714		MA165	DIODE	1	<R>
D2715		MA165	DIODE	1	<R>
D2716		MA165	DIODE	1	<R>
D2717		MA165	DIODE	1	<R>
D2722		MA165	DIODE	1	<R>
D2723		MA165	DIODE	1	<R>
D2729		MA165	DIODE	1	<R>
D2730		MA165	DIODE	1	<R>
D2737		MA165	DIODE	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
D2738		MA165	DIODE	1	<R>
D2741		MA165	DIODE	1	<R>
D2742		MA165	DIODE	1	<R>
D2743		MA165	DIODE	1	<R>
D2745		MA165	DIODE	1	<R>
D2746		MA165	DIODE	1	<R>
D2747		MA4130M	DIODE	1	<R>
IC2701		UPC393C	IC	1	<R>
IC2702		UPC324C	IC	1	<R>
IC2703		UPC324C	IC	1	<R>
IC2704		UPC324C	IC	1	<R>
IC2705		UPC324C	IC	1	<R>
IC2706		UPC339C	IC	1	<R>
IC2707		UPC393C	IC	1	<R>
IC2708		UPD4030BC	IC	1	<R>
IC2709		UPD4069UBC	IC	1	<R>
IC2710		UPD4030BC	IC	1	<R>
IC2711		UPD4066BC	IC	1	<R>
IC2712		UPD4066BC	IC	1	<R>
IC2714		UPC339C	IC	1	<R>
IC2715		UPC358C	IC	1	<R>
IC2716		UPD1511AC106	IC	1	<R>
IC2717		UPC393C	IC	1	<R>
L2701		VLQEL05F470K	COIL 47UH	1	
L2702		VLQEL06F221K	COIL 220UH	1	
L2704		VLT0193	TRANSFORMER	1	
L2705		VLT0193	TRANSFORMER	1	
P2700		VJP1233T	CONNECTOR(MALE) 6P	1	
P2701		VJP1231B	CONNECTOR(MALE) 4P	1	
P2702		VJP1231T	CONNECTOR(MALE) 4P	1	
P2703		VJP1233T	CONNECTOR(MALE) 6P	1	
P2704		VJP1231G	CONNECTOR(MALE) 4P	1	
P2705		VJP1231R	CONNECTOR(MALE) 4P	1	
P2706		VJP1246T	CONNECTOR(MALE) 6P	1	
Q2701		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2702		2SC2497	TRANSISTOR	1	(Q,R)<R>
Q2703		2SA1096	TRANSISTOR	1	(Q,R)<R>
Q2704		2SB641	TRANSISTOR	1	(Q,R)<R>
Q2705		2SC2497	TRANSISTOR	1	(Q,R)<R>
Q2706		2SA1096	TRANSISTOR	1	(Q,R)<R>
Q2707		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2708		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2709		2SC3811	TRANSISTOR	1	(Q,R)<R>
Q2710		2SD636	TRANSISTOR	1	(Q,R)<R>
Q2711		2SD636	TRANSISTOR	1	(Q,R)<R>
QR2701		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2702		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2704		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2706		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2708		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2712		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2713		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2715		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2716		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2717		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2718		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2719		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2720		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2721		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2722		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2723		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2724		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR2725		UN1213	TRANSISTOR-RESISTOR	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
QR2726		UN1213	TRANSISTOR-RESISTOR	1	<R>
			RESISTORS		
R2701		ERDS2TJ681	CARBON 1/4W 680	1	
R2702		ERDS2TJ273	CARBON 1/4W 27K	1	
R2703		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2704		ERDS2TJ104	CARBON 1/4W 100K	1	
R2705		ERDS2TJ333	CARBON 1/4W 33K	1	
R2706		ERDS2TJ104	CARBON 1/4W 100K	1	
R2707		ERDS2TJ154	CARBON 1/4W 150K	1	
R2708		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R2709		ERDS2TJ333	CARBON 1/4W 33K	1	
R2710		ERDS2TJ333	CARBON 1/4W 33K	1	
R2711		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R2712		ERDS2TJ103	CARBON 1/4W 10K	1	
R2713		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R2714		ERDS2TJ104	CARBON 1/4W 100K	1	
R2715		ERDS2TJ333	CARBON 1/4W 33K	1	
R2716		ERDS2TJ104	CARBON 1/4W 100K	1	
R2717		ERDS2TJ154	CARBON 1/4W 150K	1	
R2718		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R2719		ERDS2TJ333	CARBON 1/4W 33K	1	
R2720		ERDS2TJ333	CARBON 1/4W 33K	1	
R2721		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R2722		ERDS2TJ103	CARBON 1/4W 10K	1	
R2723		ERDS2TJ333	CARBON 1/4W 33K	1	
R2724		ERDS2TJ103	CARBON 1/4W 10K	1	
R2725		ERDS2TJ473	CARBON 1/4W 47K	1	
R2726		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R2727		ERDS2TJ102	CARBON 1/4W 1K	1	
R2728		ERDS2TJ103	CARBON 1/4W 10K	1	
R2729		ERDS2TJ103	CARBON 1/4W 10K	1	
R2730		ERDS2TJ103	CARBON 1/4W 10K	1	
R2731		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2732		ERDS2TJ223	CARBON 1/4W 22K	1	
R2733		ERDS2TJ681	CARBON 1/4W 680	1	
R2734		ERDS2TJ273	CARBON 1/4W 27K	1	
R2735		ERDS2TJ681	CARBON 1/4W 680	1	
R2736		ERDS2TJ273	CARBON 1/4W 27K	1	
R2737		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2738		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2739		ERDS2TJ224	CARBON 1/4W 220K	1	
R2740		ERDS2TJ153	CARBON 1/4W 15K	1	
R2741		ERDS2TJ104	CARBON 1/4W 100K	1	
R2742		ERDS2TJ103	CARBON 1/4W 10K	1	
R2743		ERDS2TJ333	CARBON 1/4W 33K	1	
R2744		ERDS2TJ103	CARBON 1/4W 10K	1	
R2745		ERDS2TJ104	CARBON 1/4W 100K	1	
R2746		ERDS2TJ102	CARBON 1/4W 1K	1	
R2747		ERDS2TJ103	CARBON 1/4W 10K	1	
R2748		ERDS2TJ103	CARBON 1/4W 10K	1	
R2749		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2750		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2751		ERDS2TJ105	CARBON 1/4W 1000K	1	
R2753		ERDS2TJ224	CARBON 1/4W 220K	1	
R2754		ERDS2TJ153	CARBON 1/4W 15K	1	
R2755		ERDS2TJ123	CARBON 1/4W 12K	1	
R2756		ERDS2TJ683	CARBON 1/4W 68K	1	
R2757		ERDS2TJ103	CARBON 1/4W 10K	1	
R2758		ERDS2TJ333	CARBON 1/4W 33K	1	
R2759		ERDS2TJ103	CARBON 1/4W 10K	1	
R2760		ERDS2TJ104	CARBON 1/4W 100K	1	
R2761		ERDS2TJ102	CARBON 1/4W 1K	1	
R2762		ERDS2TJ103	CARBON 1/4W 10K	1	
R2763		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2764		ERDS2TJ103	CARBON 1/4W 10K	1	
R2766		ERDS2TJ103	CARBON 1/4W 10K	1	
R2767		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2768		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2770		ERDS2TJ224	CARBON 1/4W 220K	1	
R2771		ERDS2TJ153	CARBON 1/4W 15K	1	
R2773		ERDS2TJ124	CARBON 1/4W 120K	1	
R2774		ERDS2TJ103	CARBON 1/4W 10K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R2775		ERDS2TJ103	CARBON 1/4W 10K	1	
R2776		ERDS2TJ104	CARBON 1/4W 100K	1	
R2777		ERDS2TJ102	CARBON 1/4W 1K	1	
R2778		ERDS2TJ103	CARBON 1/4W 10K	1	
R2779		ERDS2TJ103	CARBON 1/4W 10K	1	
R2780		ERDS2TJ333	CARBON 1/4W 33K	1	
R2785		ERDS2TJ683	CARBON 1/4W 68K	1	
R2786		ERDS2TJ563	CARBON 1/4W 56K	1	
R2787		ERDS2TJ683	CARBON 1/4W 68K	1	
R2788		ERDS2TJ473	CARBON 1/4W 47K	1	
R2789		ERDS2TJ103	CARBON 1/4W 10K	1	
R2790		ERDS2TJ563	CARBON 1/4W 56K	1	
R2791		ERDS2TJ223	CARBON 1/4W 22K	1	
R2792		ERDS2TJ223	CARBON 1/4W 22K	1	
R2793		ERDS2TJ223	CARBON 1/4W 22K	1	
R2794		ERDS2TJ393	CARBON 1/4W 39K	1	
R2795		ERDS2TJ103	CARBON 1/4W 10K	1	
R2798		ERDS2TJ333	CARBON 1/4W 33K	1	
R2799		ERDS2TJ333	CARBON 1/4W 33K	1	
R2800		ERDS2TJ223	CARBON 1/4W 22K	1	
R2801		ERDS2TJ223	CARBON 1/4W 22K	1	
R2802		ERDS2TJ103	CARBON 1/4W 10K	1	
R2804		ERDS2TJ104	CARBON 1/4W 100K	1	
R2805		ERDS2TJ104	CARBON 1/4W 100K	1	
R2806		ERDS2TJ104	CARBON 1/4W 100K	1	
R2807		ERDS2TJ102	CARBON 1/4W 1K	1	
R2808		ERDS2TJ102	CARBON 1/4W 1K	1	
R2809		ERDS2TJ123	CARBON 1/4W 12K	1	
R2810		ERDS2TJ103	CARBON 1/4W 10K	1	
R2811		ERDS2TJ103	CARBON 1/4W 10K	1	
R2813		ERDS2TJ561	CARBON 1/4W 560	1	
R2814		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R2815		ERDS2TJ104	CARBON 1/4W 100K	1	
R2816		ERX1ANJ1R2	METAL OXIDE 1W 1.2	1	
R2817		ERDS2TJ103	CARBON 1/4W 10K	1	
R2818		ERDS2TJ103	CARBON 1/4W 10K	1	
R2820		ERDS2TJ561	CARBON 1/4W 560	1	
R2821		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R2822		ERDS2TJ104	CARBON 1/4W 100K	1	
R2823		ERX1ANJ1R2	METAL OXIDE 1W 1.2	1	
R2824		ERDS2TJ103	CARBON 1/4W 10K	1	
R2827		ERDS2TJ103	CARBON 1/4W 10K	1	
R2828		ERDS2TJ104	CARBON 1/4W 100K	1	
R2830		ERDS2TJ153	CARBON 1/4W 15K	1	
R2831		ERDS2TJ153	CARBON 1/4W 15K	1	
R2832		ERDS2TJ123	CARBON 1/4W 12K	1	
R2834		ERDS2TJ183	CARBON 1/4W 18K	1	
R2835		ERDS2TJ183	CARBON 1/4W 18K	1	
R2836		ERDS2TJ823	CARBON 1/4W 82K	1	
R2837		ERDS2TJ823	CARBON 1/4W 82K	1	
R2838		ERDS2TJ273	CARBON 1/4W 27K	1	
R2842		ERDS2TJ102	CARBON 1/4W 1K	1	
R2843		ERDS2TJ153	CARBON 1/4W 15K	1	
R2845		ERDS2TJ153	CARBON 1/4W 15K	1	
R2846		ERDS2TJ393	CARBON 1/4W 39K	1	
R2850		ERDS2TJ102	CARBON 1/4W 1K	1	
R2853		ERDS2TJ103	CARBON 1/4W 10K	1	
R2854		ERDS2TJ103	CARBON 1/4W 10K	1	
R2855		ERDS2TJ103	CARBON 1/4W 10K	1	
R2856		ERDS2TJ105	CARBON 1/4W 1000K	1	
R2857		ERDS2TJ223	CARBON 1/4W 22K	1	
R2858		ERDS2TJ223	CARBON 1/4W 22K	1	
R2859		ERDS2TJ183	CARBON 1/4W 18K	1	
R2860		ERDS2TJ183	CARBON 1/4W 18K	1	
R2861		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2869		ERDS2TJ183	CARBON 1/4W 18K	1	
R2870		ERDS2TJ103	CARBON 1/4W 10K	1	
R2871		ERDS2TJ103	CARBON 1/4W 10K	1	
R2875		ERDS2TJ104	CARBON 1/4W 100K	1	
R2877		ERDS2TJ103	CARBON 1/4W 10K	1	
R2878		ERDS2TJ103	CARBON 1/4W 10K	1	
R2879		ERDS2TJ103	CARBON 1/4W 10K	1	
R2880		ERDS2TJ103	CARBON 1/4W 10K	1	
R2881		ERDS2TJ103	CARBON 1/4W 10K	1	
R2882		ERDS2TJ103	CARBON 1/4W 10K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R2883		ERDS2TJ103	CARBON 1/4W 10K	1	
R2884		ERDS2TJ103	CARBON 1/4W 10K	1	
R2885		ERDS2TJ103	CARBON 1/4W 10K	1	
R2890		ERX1ANJR33	METAL OXIDE 1W 0.33	1	
R2891		ERDS2TJ104	CARBON 1/4W 100K	1	
R2892		ERDS2TJ104	CARBON 1/4W 100K	1	
R2893		ERDS2TJ102	CARBON 1/4W 1K	1	
R2894		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R2895		ERDS2TJ105	CARBON 1/4W 1000K	1	
R2896		ERDS2TJ105	CARBON 1/4W 1000K	1	
R2897		ERDS2TJ104	CARBON 1/4W 100K	1	
X2701		VSX0128	CRYSTAL OSCILLATOR	1	
	■	VEP03389A	VIDEO C.B.A.		INCLUDING THE VIDEO METER PACK C.B.A. (VEP00J21A)
			CAPACITORS		
C3001		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3002		ECEA1AK101	ELECTROLYTIC 10V 100U	1	
C3003		ECEA1AK101	ELECTROLYTIC 10V 100U	1	
C3004		ECEA0JK221	ELECTROLYTIC 6.3V 220U	1	
C3005		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3006		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C3007		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3008		ECEA1CK220	ELECTROLYTIC 16V 22U	1	
C3009		ECEA1CK220	ELECTROLYTIC 16V 22U	1	
C3010		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3011		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3012		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3013		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C3014		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3015		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3016		ECEA0JU471	ELECTROLYTIC 6.3V 470U	1	
C3017		ECEA1EK4R7	ELECTROLYTIC 25V 4.7U	1	
C3018		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3019		ECCF1H121JC	CERAMIC 50V 120P	1	
C3020		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3021		ECCF1H390JC	CERAMIC 50V 39P	1	
C3022		ECCF1H121JC	CERAMIC 50V 120P	1	
C3023		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3024		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3025		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3026		ECCF1H220KC	CERAMIC 50V 22P	1	
C3027		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C3028		ECCF1H470KC	CERAMIC 50V 47P	1	
C3029		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3030		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3031		ECKF1H221KB	CERAMIC 50V 220P	1	
C3032		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3033		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3034		ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C3035		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3036		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3037		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3038		ECCF1H150KC	CERAMIC 50V 15P	1	
C3039		ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C3040		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3041		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3042		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C3043		ECQB1H103JH	MYLAR 50V 0.01U	1	
C3044		ECQB1H103JH	MYLAR 50V 0.01U	1	
C3045		ECCF1H101KC	CERAMIC 50V 100P	1	
C3046		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3047		ECQB1H333JH	MYLAR 50V 0.033U	1	
C3048		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3049		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3050		ECKF1H122KB	CERAMIC 50V 1200P	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C3051		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C3052		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3053		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3054		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3055		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3056		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3057		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3058		ECKF1H221KB	CERAMIC 50V 220P	1	
C3059		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C3060		ECCF1H101KC	CERAMIC 50V 100P	1	
C3061		ECEA0JN101S	ELECTROLYTIC 6.3V 100U	1	
C3062		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3063		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3064		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3065		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3066		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3067		ECCF1H820JC	CERAMIC 50V 82P	1	
C3068		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3069		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3070		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3071		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3072		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3073		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3074		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3075		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3076		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C3077		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3078		ECEA1AK101	ELECTROLYTIC 10V 100U	1	
C3079		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3080		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3081		ECKF1H471KB	CERAMIC 50V 470P	1	
C3082		ECQM1H182JV	MYLAR 50V 1800P	1	
C3083		ECCF1H271JC	CERAMIC 50V 270P	1	
C3084		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3085		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C3086		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C3087		ECEA0JU471	ELECTROLYTIC 6.3V 470U	1	
C3088		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3089		ECCF1H470KC	CERAMIC 50V 47P	1	
C3090		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3091		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3092		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3093		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3094		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3095		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3096		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3097		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3098		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3099		ECKF1H222KB	CERAMIC 50V 2200P	1	
C3100		ECKF1H122KB	CERAMIC 50V 1200P	1	
C3101		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3102		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3103		ECKF1H222KB	CERAMIC 50V 2200P	1	
C3104		ECCF1H390KC	CERAMIC 50V 39P	1	
C3105		ECCF1H220KC	CERAMIC 50V 22P	1	
C3106		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3107		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3108		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3109		ECCF1H121JC	CERAMIC 50V 120P	1	
C3110		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3111		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3112		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3113		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3114		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3115		ECCF1H100DC	CERAMIC 50V 10P	1	
C3116		VCKD1H431JA	CERAMIC 50V 430P	1	
C3117		ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C3118		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3119		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3120		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3121		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3122		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3123		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3124		ECKF1H151KB	CERAMIC 50V 150P	1	
C3125		ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C3126		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3127		ECEA1AK101	ELECTROLYTIC 10V 100U	1	
C3128		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3129		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C3130		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C3131		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3132		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3133		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3134		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3135		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C3136		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3137		ECCF1H560KC	CERAMIC 50V 56P	1	
C3138		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3139		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3140		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3141		ECEA1CU221	ELECTROLYTIC 16V 220U	1	
C3142		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C3143		ECKF1H681KB	CERAMIC 50V 680P	1	
C3144		ECKF1H122KB	CERAMIC 50V 1200P	1	
C3145		ECKF1H331KB	CERAMIC 50V 330P	1	
C3146		ECEA1AK221Z	ELECTROLYTIC 10V 220U	1	
C3147		ECEA1AK101	ELECTROLYTIC 10V 100U	1	
C3148		ECEA1AK221Z	ELECTROLYTIC 10V 220U	1	
C3149		ECQM1H103JV	MYLAR 50V 0.01U	1	
C3150		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3151		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3152		ECEA1EK4R7	ELECTROLYTIC 25V 4.7U	1	
C3153		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3154		ECEA1CU221	ELECTROLYTIC 16V 220U	1	
C3155		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3156		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3157		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3158		ECEA0JU471	ELECTROLYTIC 6.3V 470U	1	
C3159		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3160		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3161		ECEA1ASS102	ELECTROLYTIC 10V 1000U	1	
C3162		ECEA1ASS102	ELECTROLYTIC 10V 1000U	1	
C3163		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3164		ECEA1CU471	ELECTROLYTIC 16V 470U	1	
C3165		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3166		ECEA1CU471	ELECTROLYTIC 16V 470U	1	
C3167		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3168		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3169		ECEA1ASS102	ELECTROLYTIC 10V 1000U	1	
C3170		ECEA1ASS102	ELECTROLYTIC 10V 1000U	1	
C3171		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3172		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3173		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3174		ECEA0JU471	ELECTROLYTIC 6.3V 470U	1	
C3175		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3176		ECCF1H820KC	CERAMIC 50V 82P	1	
C3177		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3178		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3179		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3180		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3181		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3182		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3183		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3184		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3185		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3186		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3187		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3188		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3189		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3190		ECKF1H221KB	CERAMIC 50V 220P	1	
C3191		ECQM1H103JV	MYLAR 50V 0.01U	1	
C3192		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3193		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3194		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3195		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3196		ECEA0JK221	ELECTROLYTIC 6.3V 220U	1	
C3197		ECEA0JK221	ELECTROLYTIC 6.3V 220U	1	
C3198		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3199		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C3200		ECKF1H103ZF	CERAMIC 50V 0.01U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C3201		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C3202		ECCF1H220JC	CERAMIC 50V 22P	1	
C3203		ECCF1H680JC	CERAMIC 50V 68P	1	
C3204		ECEA1AK330	ELECTROLYTIC 10V 33U	1	
C3205		ECKF1H181KB	CERAMIC 50V 1800P	1	
C3206		ECCF1H100DC	CERAMIC 50V 10P	1	
C3207		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3208		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3209		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3210		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C3211		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3212		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3213		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C3214		ECEA1HK4R7	ELECTROLYTIC 50V 4.7U	1	
C3215		ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C3216		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3217		ECCF1H820KC	CERAMIC 50V 82P	1	
C3218		ECCF1H470KC	CERAMIC 50V 47P	1	
C3219		ECCF1H180KC	CERAMIC 50V 18P	1	
C3220		ECV1ZW30X64T	TRIMMER 30P	1	
C3221		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3222		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3223		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3224		ECCF1H390KC	CERAMIC 50V 39P	1	
C3225		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3226		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3227		ECKF1H221KB	CERAMIC 50V 220P	1	
C3228		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3229		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C3230		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3231		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3232		ECCF1H680KC	CERAMIC 50V 68P	1	
C3233		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C3234		ECCF1H101KC	CERAMIC 50V 100P	1	
C3286		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
D3001		MA165	DIODE	1	<R>
D3002		MA165	DIODE	1	<R>
D3003		1SS99	DIODE	1	<R>
D3004		MA165	DIODE	1	<R>
D3005		MA165	DIODE	1	<R>
D3006		MA165	DIODE	1	<R>
D3007		MA165	DIODE	1	<R>
D3008		MA165	DIODE	1	<R>
D3009		MA165	DIODE	1	<R>
D3010		MA165	DIODE	1	<R>
D3011		1SS99	DIODE	1	<R>
D3012		1SS99	DIODE	1	<R>
D3013		MA165	DIODE	1	<R>
D3014		MA165	DIODE	1	<R>
D3015		MA165	DIODE	1	<R>
D3016		MA165	DIODE	1	<R>
D3017		MA165	DIODE	1	<R>
D3018		1SS99	DIODE	1	<R>
D3019		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D3020		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D3021		1SS99	DIODE	1	<R>
D3022		1SS99	DIODE	1	<R>
D3023		MA165	DIODE	1	<R>
D3024		MA165	DIODE	1	<R>
D3025		MA165	DIODE	1	<R>
D3026		MA165	DIODE	1	<R>
D3027		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D3028		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D3029		1SS99	DIODE	1	<R>
D3030		1SS99	DIODE	1	<R>
DL3001		ELB4L025	FILTER	1	<R>
DL3002		VLD0077	DELAY LINE	1	<R>
DL3003		VLD0038	DELAY LINE	1	<R>
DL3004		ELT8D301	TRANSFORMER	1	<R>
DL3005		VLD0113	DELAY LINE	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
FL3001		VLF0287	FILTER	1	
FL3002		VLF0056	FILTER	1	
FL3003		VLF0208	FILTER	1	
FL3004		VLF0063	FILTER	1	
FL3006		VLF0155	FILTER	1	
FL3007		VLF0155	FILTER	1	
FL3008		VLF0561	FILTER	1	
IC3001		UPD4066BC	IC	1	<R>
IC3002		BA7001	IC	1	<R>
IC3003		AN6306	IC	1	<R>
IC3004		M51457AP	IC	1	<R>
IC3005		BA7001	IC	1	<R>
IC3006		AN6337	IC	1	<R>
IC3007		AN6326N	IC	1	<R>
IC3008		UPD4011BC	IC	1	<R>
IC3009		UPC324C	IC	1	<R>
IC3010		UPD4066BC	IC	1	<R>
IC3011		BA401	IC	1	<R>
IC3012		MSM6967RS	IC	1	<R>
IC3013		AN78L05	IC	1	<R>
IC3014		AN78L09	IC	1	<R>
L3001		VLQEL05F221K	COIL 220UH	1	
L3002		VLQEL05F221K	COIL 220UH	1	
L3003		VLQEL05F101K	COIL 100UH	1	
L3004		VLQEL05F101K	COIL 100UH	1	
L3005		VLQEL05F150K	COIL 15UH	1	
L3006		VLQEL05F820K	COIL 82UH	1	
L3007		VLQEL05F1R0K	COIL 1UH	1	
L3008		VLQEL05F101K	COIL 100UH	1	
L3009		VLQEL05F101K	COIL 100UH	1	
L3010		VLQEL05F101K	COIL 100UH	1	
L3011		VLQEL05F221K	COIL 220UH	1	
L3012		VLQEL05F151K	COIL 150UH	1	
L3013		VLQEL05F820K	COIL 82UH	1	
L3014		VLQEL05F221K	COIL 220UH	1	
L3015		VLQEL05F121K	COIL 120UH	1	
L3016		VLQEL05F101K	COIL 100UH	1	
L3017		VLQEL05F100K	COIL 10UH	1	
L3018		VLQEL05F100K	COIL 10UH	1	
L3019		VLQEL05F101K	COIL 100UH	1	
L3020		VLQEL05F471K	COIL 470UH	1	
L3021		VLQEL05F221K	COIL 220UH	1	
L3022		VLQEL05F151K	COIL 150UH	1	
L3023		VLQEL05F221K	COIL 220UH	1	
L3024		VLQEL05F101K	COIL 100UH	1	
L3025		VLQEL05F221K	COIL 220UH	1	
L3026		VLQEL05F221K	COIL 220UH	1	
L3027		VLQEL05F221K	COIL 220UH	1	
L3028		VLQEL05F180K	COIL 18UH	1	
L3029		VLQEL05F101K	COIL 100UH	1	
L3030		VLQEL05F330K	COIL 33UH	1	
L3031		VLQEL05F150K	COIL 15UH	1	
L3032		VLQEL05F3R3K	COIL 3.3UH	1	
L3033		VLQEL05F221K	COIL 220UH	1	
L3034		VLQEL05F221K	COIL 220UH	1	
L3035		VLQEL05F221K	COIL 220UH	1	
L3036		VLQEL05F221K	COIL 220UH	1	
L3037		VLQEL05F221K	COIL 220UH	1	
L3038		VLQEL05F150K	COIL 15UH	1	
L3039		EIK10S593A	COIL	1	
L3040		VLQEL05F221K	COIL 220UH	1	
L3041		VLQEL05F680K	COIL 68UH	1	
L3042		VLQEL05F100K	COIL 10UH	1	
L3043		VLQEL05F221K	COIL 220UH	1	
L3044		VLQEL05F221K	COIL 220UH	1	
L3045		VLQEL05F560K	COIL 56UH	1	
L3046		VLQEL05F331K	COIL 330UH	1	
L3047		VLQEL05F221K	COIL 220UH	1	
L3048		VLQEL05F221K	COIL 220UH	1	
L3049		VLQEL05F221K	COIL 220UH	1	
L3050		VLQEL05F100K	COIL 10UH	1	
P3001		VJP1230	CONNECTOR(MALE) 3P	1	
P3002		VJP1232T	CONNECTOR(MALE) 5P	1	
P3003		VJP1229	CONNECTOR(MALE) 2P	1	
P3004		VJP1234T	CONNECTOR(MALE) 7P	1	
P3005		VJP1229	CONNECTOR(MALE) 2P	1	
P3006		VJP1234T	CONNECTOR(MALE) 7P	1	
P3007		VJP1235T	CONNECTOR(MALE) 8P	1	
P3008		VJP1238T	CONNECTOR(MALE) 11P	1	
P3009		VJP1230T	CONNECTOR(MALE) 3P	1	
P3010		VJP1230	CONNECTOR(MALE) 3P	1	
P3011		VJP1234T	CONNECTOR(MALE) 7P	1	
P3012		VJP1230R	CONNECTOR(MALE) 3P	1	
P3013		VJP1231B	CONNECTOR(MALE) 4P	1	
P3014		VJP1229	CONNECTOR(MALE) 2P	1	
P3015		VJP1231T	CONNECTOR(MALE) 4P	1	
P3016		VJP1229T	CONNECTOR(MALE) 2P	1	
Q3001		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3002		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3003		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3004		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3005		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3006		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3007		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3008		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3009		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3010		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3011		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3012		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3013		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3014		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3015		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3016		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3017		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3018		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3019		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3020		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3021		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3022		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3023		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3024		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3025		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3026		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3027		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3028		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3029		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3030		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3031		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3032		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3033		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3034		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3035		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3036		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3037		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3038		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3039		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3040		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3041		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3042		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3043		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3045		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3046		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3047		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3048		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3049		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3050		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3051		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3052		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3053		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3054		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3055		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3056		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3057		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3058		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3059		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3060		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3061		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3062		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3063		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3064		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3065		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3066		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3067		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3068		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3069		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3070		2SB643	TRANSISTOR	1	(Q,R)<R>
Q3071		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3072		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3073		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3074		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3075		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3076		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3077		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3078		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3079		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3080		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3081		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3082		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3083		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3084		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3085		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3086		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3087		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3088		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3089		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3090		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3091		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3092		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3093		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3094		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3095		2SD636	TRANSISTOR	1	(Q,R)<R>
Q3096		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3097		2SB641	TRANSISTOR	1	(Q,R)<R>
Q3098		2SC2206	TRANSISTOR	1	(B,C)<R>
Q3099		2SC2206	TRANSISTOR	1	(B,C)<R>
QR3001		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR3002		UN1212	TRANSISTOR-RESISTOR	1	<R>
QR3003		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR3004		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR3006		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR3007		UN1212	TRANSISTOR-RESISTOR	1	<R>
QR3008		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR3009		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR3010		DTC144WA	TRANSISTOR RESISTOR	1	<R>
QR3011		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR3012		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR3014		UN1211	TRANSISTOR-RESISTOR	1	<R>
			RESISTORS		
R3001		ERDS2TJ223	CARBON 1/4W 22K	1	
R3002		ERDS2TJ153	CARBON 1/4W 15K	1	
R3003		ERDS2TJ223	CARBON 1/4W 22K	1	
R3004		ERDS2TJ153	CARBON 1/4W 15K	1	
R3005		ERDS2TJ102	CARBON 1/4W 1K	1	
R3006		ERDS2TJ221	CARBON 1/4W 220	1	
R3007		ERDS2TJ103	CARBON 1/4W 10K	1	
R3008		ERDS2TJ103	CARBON 1/4W 10K	1	
R3009		ERDS2TJ103	CARBON 1/4W 10K	1	
R3010		ERDS2TJ223	CARBON 1/4W 22K	1	
R3011		ERDS2TJ153	CARBON 1/4W 15K	1	
R3012		ERDS2TJ103	CARBON 1/4W 10K	1	
R3013		ERDS2TJ103	CARBON 1/4W 10K	1	
R3014		ERDS2TJ102	CARBON 1/4W 1K	1	
R3015		ERDS2TJ102	CARBON 1/4W 1K	1	
R3016		ERDS2TJ153	CARBON 1/4W 15K	1	
R3017		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R3018		ERDS2TJ104	CARBON 1/4W 100K	1	
R3019		ERDS2TJ473	CARBON 1/4W 47K	1	
R3020		ERDS2TJ330	CARBON 1/4W 33	1	
R3021		ERDS2TJ103	CARBON 1/4W 10K	1	
R3022		ERDS2TJ223	CARBON 1/4W 22K	1	
R3023		ERDS2TJ102	CARBON 1/4W 1K	1	
R3024		ERDS2TJ102	CARBON 1/4W 1K	1	
R3025		ERDS2TJ102	CARBON 1/4W 1K	1	
R3026		ERDS2TJ102	CARBON 1/4W 1K	1	
R3027		ERDS2TJ102	CARBON 1/4W 1K	1	
R3028		ERDS2TJ473	CARBON 1/4W 47K	1	
R3029		ERDS2TJ223	CARBON 1/4W 22K	1	
R3030		ERDS2TJ124	CARBON 1/4W 120K	1	
R3031		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R3032		ERDS2TJ123	CARBON 1/4W 12K	1	
R3033		ERDS2TJ563	CARBON 1/4W 56K	1	
R3034		ERDS2TJ103	CARBON 1/4W 10K	1	
R3035		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R3036		ERDS2TJ103	CARBON 1/4W 10K	1	
R3037		ERDS2TJ473	CARBON 1/4W 47K	1	
R3038		ERDS2TJ473	CARBON 1/4W 47K	1	
R3039		ERDS2TJ102	CARBON 1/4W 1K	1	
R3040		ERDS2TJ271	CARBON 1/4W 270	1	
R3041		ERDS2TJ561	CARBON 1/4W 560	1	
R3042		ERDS2TJ102	CARBON 1/4W 1K	1	
R3043		ERDS2TJ681	CARBON 1/4W 680	1	
R3044		ERDS2TJ331	CARBON 1/4W 330	1	
R3045		ERDS2TJ333	CARBON 1/4W 33K	1	
R3046		ERDS2TJ333	CARBON 1/4W 33K	1	
R3047		ERDS2TJ750	CARBON 1/4W 75	1	
R3048		ERDS2TJ102	CARBON 1/4W 1K	1	
R3049		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R3050		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R3051		ERDS2TJ391	CARBON 1/4W 390	1	
R3052		ERDS2TJ333	CARBON 1/4W 33K	1	
R3053		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3054		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3055		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3056		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3057		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3058		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3059		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3060		ERDS2TJ104	CARBON 1/4W 100K	1	
R3061		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R3062		ERDS2TJ101	CARBON 1/4W 100	1	
R3063		ERDS2TJ105	CARBON 1/4W 1000K	1	
R3064		ERDS2TJ105	CARBON 1/4W 1000K	1	
R3065		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R3066		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3067		ERDS2TJ104	CARBON 1/4W 100K	1	
R3068		ERDS2TJ103	CARBON 1/4W 10K	1	
R3069		ERDS2TJ104	CARBON 1/4W 100K	1	
R3070		ERDS2TJ102	CARBON 1/4W 1K	1	
R3071		ERDS2TJ104	CARBON 1/4W 100K	1	
R3072		ERDS2TJ103	CARBON 1/4W 10K	1	
R3073		ERDS2TJ102	CARBON 1/4W 1K	1	
R3074		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R3075		ERDS2TJ102	CARBON 1/4W 1K	1	
R3076		ERDS2TJ102	CARBON 1/4W 1K	1	
R3077		ERDS2TJ103	CARBON 1/4W 10K	1	
R3078		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R3079		ERDS2TJ153	CARBON 1/4W 15K	1	
R3080		ERDS2TJ153	CARBON 1/4W 15K	1	
R3081		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R3082		ERDS2TJ102	CARBON 1/4W 1K	1	
R3083		ERDS2TJ153	CARBON 1/4W 15K	1	
R3084		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3085		ERDS2TJ102	CARBON 1/4W 1K	1	
R3086		ERDS2TJ561	CARBON 1/4W 560	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R3087		ERDS2TJ102	CARBON 1/4W 1K	1	
R3088		ERDS2TJ681	CARBON 1/4W 680	1	
R3089		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R3090		ERDS2TJ564	CARBON 1/4W 560K	1	
R3091		ERDS2TJ104	CARBON 1/4W 100K	1	
R3092		ERDS2TJ391	CARBON 1/4W 390	1	
R3093		ERDS2TJ394	CARBON 1/4W 390K	1	
R3094		ERDS2TJ821	CARBON 1/4W 820	1	
R3095		ERDS2TJ102	CARBON 1/4W 1K	1	
R3096		ERDS2TJ821	CARBON 1/4W 820	1	
R3097		ERDS2TJ561	CARBON 1/4W 560	1	
R3098		ERDS2TJ102	CARBON 1/4W 1K	1	
R3099		ERDS2TJ223	CARBON 1/4W 22K	1	
R3100		ERDS2TJ123	CARBON 1/4W 12K	1	
R3101		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R3102		ERDS2TJ181	CARBON 1/4W 180	1	
R3103		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R3104		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R3105		ERDS2TJ101	CARBON 1/4W 100	1	
R3106		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3107		ERDS2TJ103	CARBON 1/4W 10K	1	
R3108		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R3109		ERDS2TJ103	CARBON 1/4W 10K	1	
R3110		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R3111		ERDS2TJ102	CARBON 1/4W 1K	1	
R3112		ERDS2TJ820	CARBON 1/4W 82	1	
R3113		ERDS2TJ681	CARBON 1/4W 680	1	
R3114		ERDS2TJ681	CARBON 1/4W 680	1	
R3115		ERDS2TJ821	CARBON 1/4W 820	1	
R3116		ERDS2TJ102	CARBON 1/4W 1K	1	
R3117		ERDS2TJ393	CARBON 1/4W 39K	1	
R3118		ERDS2TJ103	CARBON 1/4W 10K	1	
R3119		ERDS2TJ102	CARBON 1/4W 1K	1	
R3120		ERDS2TJ103	CARBON 1/4W 10K	1	
R3121		ERDS2TJ223	CARBON 1/4W 22K	1	
R3122		ERDS2TJ330	CARBON 1/4W 33	1	
R3123		ERDS2TJ102	CARBON 1/4W 1K	1	
R3124		ERDS2TJ102	CARBON 1/4W 1K	1	
R3125		ERDS2TJ561	CARBON 1/4W 560	1	
R3126		ERDS2TJ561	CARBON 1/4W 560	1	
R3127		ERDS2TJ101	CARBON 1/4W 100	1	
R3128		ERDS2TJ181	CARBON 1/4W 180	1	
R3129		ERDS2TJ101	CARBON 1/4W 100	1	
R3130		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R3131		ERDS2TJ333	CARBON 1/4W 33K	1	
R3132		ERDS2TJ102	CARBON 1/4W 1K	1	
R3133		ERDS2TJ102	CARBON 1/4W 1K	1	
R3134		ERDS2TJ561	CARBON 1/4W 560	1	
R3135		ERDS2TJ102	CARBON 1/4W 1K	1	
R3136		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R3137		ERDS2TJ105	CARBON 1/4W 1000K	1	
R3138		ERDS2TJ564	CARBON 1/4W 560K	1	
R3139		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R3140		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R3141		ERDS2TJ561	CARBON 1/4W 560	1	
R3142		ERDS2TJ391	CARBON 1/4W 390	1	
R3143		ERDS2TJ391	CARBON 1/4W 390	1	
R3144		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R3145		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R3146		ERDS2TJ102	CARBON 1/4W 1K	1	
R3147		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R3148		ERDS2TJ102	CARBON 1/4W 1K	1	
R3149		ERDS2TJ103	CARBON 1/4W 10K	1	
R3150		ERDS2TJ103	CARBON 1/4W 10K	1	
R3151		ERDS2TJ102	CARBON 1/4W 1K	1	
R3152		ERDS2TJ331	CARBON 1/4W 330	1	
R3153		ERDS2TJ560	CARBON 1/4W 56	1	
R3154		ERDS2TJ102	CARBON 1/4W 1K	1	
R3155		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3156		ERDS2TJ473	CARBON 1/4W 47K	1	
R3158		ERDS2TJ223	CARBON 1/4W 22K	1	
R3159		ERDS2TJ333	CARBON 1/4W 33K	1	
R3160		ERDS2TJ333	CARBON 1/4W 33K	1	
R3161		ERDS2TJ223	CARBON 1/4W 22K	1	
R3162		ERDS2TJ102	CARBON 1/4W 1K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R3163		ERDS2TJ102	CARBON 1/4W 1K	1	
R3164		ERDS2TJ223	CARBON 1/4W 22K	1	
R3165		ERDS2TJ223	CARBON 1/4W 22K	1	
R3166		ERDS2TJ330	CARBON 1/4W 33	1	
R3167		ERDS2TJ101	CARBON 1/4W 100	1	
R3168		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R3169		ERDS2TJ223	CARBON 1/4W 22K	1	
R3170		ERDS2TJ391	CARBON 1/4W 390	1	
R3171		ERDS2TJ102	CARBON 1/4W 1K	1	
R3172		ERDS2TJ103	CARBON 1/4W 10K	1	
R3173		ERDS2TJ103	CARBON 1/4W 10K	1	
R3174		ERDS2TJ102	CARBON 1/4W 1K	1	
R3175		ERDS2TJ103	CARBON 1/4W 10K	1	
R3176		ERDS2TJ681	CARBON 1/4W 680	1	
R3178		ERDS2TJ223	CARBON 1/4W 22K	1	
R3179		ERDS2TJ333	CARBON 1/4W 33K	1	
R3180		ERDS2TJ102	CARBON 1/4W 1K	1	
R3181		ERDS2TJ393	CARBON 1/4W 39K	1	
R3182		ERDS2TJ103	CARBON 1/4W 10K	1	
R3183		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R3184		ERDS2TJ821	CARBON 1/4W 820	1	
R3185		ERDS2TJ561	CARBON 1/4W 560	1	
R3186		ERDS2TJ102	CARBON 1/4W 1K	1	
R3187		ERDS2TJ681	CARBON 1/4W 680	1	
R3188		ERDS2TJ330	CARBON 1/4W 33	1	
R3189		ERDS2TJ330	CARBON 1/4W 33	1	
R3190		ERDS2TJ750	CARBON 1/4W 75	1	
R3191		ERDS2TJ681	CARBON 1/4W 680	1	
R3192		ERDS2TJ223	CARBON 1/4W 22K	1	
R3193		ERDS2TJ123	CARBON 1/4W 12K	1	
R3194		ERDS2TJ561	CARBON 1/4W 560	1	
R3195		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R3196		ERDS2TJ153	CARBON 1/4W 15K	1	
R3197		ERDS2TJ563	CARBON 1/4W 56K	1	
R3198		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R3199		ERDS2TJ102	CARBON 1/4W 1K	1	
R3200		ERDS2TJ561	CARBON 1/4W 560	1	
R3201		ERDS2TJ821	CARBON 1/4W 820	1	
R3202		ERDS2TJ103	CARBON 1/4W 10K	1	
R3203		ERDS2TJ223	CARBON 1/4W 22K	1	
R3204		ERDS2TJ102	CARBON 1/4W 1K	1	
R3205		ERDS2TJ221	CARBON 1/4W 220	1	
R3206		ERDS2TJ221	CARBON 1/4W 220	1	
R3207		ERDS2TJ102	CARBON 1/4W 1K	1	
R3208		ERDS2TJ471	CARBON 1/4W 470	1	
R3209		ERDS2TJ331	CARBON 1/4W 330	1	
R3210		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3211		ERDS2TJ221	CARBON 1/4W 220	1	
R3212		ERDS2TJ102	CARBON 1/4W 1K	1	
R3213		ERDS2TJ153	CARBON 1/4W 15K	1	
R3214		ERDS2TJ153	CARBON 1/4W 15K	1	
R3215		ERDS2TJ330	CARBON 1/4W 33	1	
R3216		ERDS2TJ101	CARBON 1/4W 100	1	
R3217		ERDS2TJ273	CARBON 1/4W 27K	1	
R3218		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3219		ERDS2TJ681	CARBON 1/4W 680	1	
R3220		ERDS2TJ471	CARBON 1/4W 470	1	
R3221		ERDS2TJ271	CARBON 1/4W 270	1	
R3222		ERDS2TJ221	CARBON 1/4W 220	1	
R3223		ERDS2TJ221	CARBON 1/4W 220	1	
R3225		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R3226		ERDS2TJ333	CARBON 1/4W 33K	1	
R3227		ERDS2TJ223	CARBON 1/4W 22K	1	
R3228		ERDS2TJ223	CARBON 1/4W 22K	1	
R3229		ERDS2TJ102	CARBON 1/4W 1K	1	
R3230		ERDS2TJ561	CARBON 1/4W 560	1	
R3231		ERDS2TJ153	CARBON 1/4W 15K	1	
R3232		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R3233		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R3234		ERDS2TJ331	CARBON 1/4W 330	1	
R3235		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R3236		ERDS2TJ121	CARBON 1/4W 120	1	
R3237		ERDS2TJ390	CARBON 1/4W 39	1	
R3238		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R3239		ERDS2TJ102	CARBON 1/4W 1K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R3240		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R3241		ERDS2TJ681	CARBON 1/4W 680	1	
R3242		ERDS2TJ103	CARBON 1/4W 10K	1	
R3243		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R3244		ERDS2TJ102	CARBON 1/4W 1K	1	
R3245		ERDS2TJ681	CARBON 1/4W 680	1	
R3246		ERDS2TJ681	CARBON 1/4W 680	1	
R3247		ERDS2TJ102	CARBON 1/4W 1K	1	
R3248		ERDS2TJ681	CARBON 1/4W 680	1	
R3249		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R3250		ERDS2TJ102	CARBON 1/4W 1K	1	
R3251		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R3252		ERDS2TJ820	CARBON 1/4W 82	1	
R3253		ERDS2TJ102	CARBON 1/4W 1K	1	
R3254		ERDS2TJ102	CARBON 1/4W 1K	1	
R3255		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R3256		ERDS2TJ331	CARBON 1/4W 330	1	
R3257		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R3258		ERDS2TJ223	CARBON 1/4W 22K	1	
R3259		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R3260		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R3261		ERDS2TJ102	CARBON 1/4W 1K	1	
R3262		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R3263		ERDS2TJ223	CARBON 1/4W 22K	1	
R3264		ERDS2TJ471	CARBON 1/4W 470	1	
R3265		ERDS2TJ121	CARBON 1/4W 120	1	
R3266		ERDS2TJ471	CARBON 1/4W 470	1	
R3267		ERDS2TJ471	CARBON 1/4W 470	1	
R3268		ERDS2TJ102	CARBON 1/4W 1K	1	
R3269		ERDS2TJ331	CARBON 1/4W 330	1	
R3270		ERDS2TJ331	CARBON 1/4W 330	1	
R3271		ERDS2TJ103	CARBON 1/4W 10K	1	
R3272		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3273		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R3274		ERDS2TJ101	CARBON 1/4W 100	1	
R3275		ERDS2TJ103	CARBON 1/4W 10K	1	
R3276		ERDS2TJ103	CARBON 1/4W 10K	1	
R3277		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3278		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R3279		ERDS2TJ101	CARBON 1/4W 100	1	
R3280		ERDS2TJ103	CARBON 1/4W 10K	1	
R3281		ERDS2TJ104	CARBON 1/4W 100K	1	
R3282		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R3283		ERDS2TJ331	CARBON 1/4W 330	1	
R3284		ERDS2TJ561	CARBON 1/4W 560	1	
R3285		ERDS2TJ103	CARBON 1/4W 10K	1	
R3286		ERDS2TJ223	CARBON 1/4W 22K	1	
R3287		ERDS2TJ681	CARBON 1/4W 680	1	
R3288		ERDS2TJ102	CARBON 1/4W 1K	1	
R3289		ERDS2TJ681	CARBON 1/4W 680	1	
R3290		ERDS2TJ471	CARBON 1/4W 470	1	
R3291		ERDS2TJ102	CARBON 1/4W 1K	1	
R3292		ERDS2TJ183	CARBON 1/4W 18K	1	
R3293		ERDS2TJ103	CARBON 1/4W 10K	1	
R3294		ERDS2TJ102	CARBON 1/4W 1K	1	
R3295		ERDS2TJ102	CARBON 1/4W 1K	1	
R3296		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R3297		ERDS2TJ221	CARBON 1/4W 220	1	
R3298		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R3299		ERDS2TJ102	CARBON 1/4W 1K	1	
R3300		ERDS2TJ271	CARBON 1/4W 270	1	
R3301		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R3302		ERDS2TJ183	CARBON 1/4W 18K	1	
R3303		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R3304		ERDS2TJ561	CARBON 1/4W 560	1	
R3305		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R3306		ERDS2TJ101	CARBON 1/4W 100	1	
R3307		ERDS2TJ101	CARBON 1/4W 100	1	
R3308		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R3309		ERDS2TJ101	CARBON 1/4W 100	1	
R3310		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R3311		ERDS2TJ561	CARBON 1/4W 560	1	
R3312		ERDS2TJ223	CARBON 1/4W 22K	1	
R3313		ERDS2TJ224	CARBON 1/4W 220K	1	
R3314		ERDS2TJ471	CARBON 1/4W 470	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R3315		ERDS2TJ561	CARBON 1/4W 560	1	
R3317		ERDS2TJ821	CARBON 1/4W 820	1	
R3318		ERDS2TJ100	CARBON 1/4W 10	1	
R3319		ERDS2TJ153	CARBON 1/4W 15K	1	
R3320		ERDS2TJ102	CARBON 1/4W 1K	1	
R3321		ERDS2TJ102	CARBON 1/4W 1K	1	
R3322		ERDS2TJ473	CARBON 1/4W 47K	1	
R3323		ERDS2TJ473	CARBON 1/4W 47K	1	
R3324		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R3325		ERDS2TJ331	CARBON 1/4W 330	1	
R3326		ERDS2TJ331	CARBON 1/4W 330	1	
R3327		ERDS2TJ103	CARBON 1/4W 10K	1	
R3328		ERDS2TJ101	CARBON 1/4W 100	1	
R3329		ERDS2TJ102	CARBON 1/4W 1K	1	
R3330		ERDS2TJ103	CARBON 1/4W 10K	1	
R3331		ERDS2TJ103	CARBON 1/4W 10K	1	
R3332		ERDS2TJ223	CARBON 1/4W 22K	1	
R3333		ERDS2TJ223	CARBON 1/4W 22K	1	
R3334		ERDS2TJ102	CARBON 1/4W 1K	1	
R3335		ERDS2TJ333	CARBON 1/4W 33K	1	
R3336		ERDS2TJ223	CARBON 1/4W 22K	1	
R3337		ERDS2TJ681	CARBON 1/4W 680	1	
R3338		ERDS2TJ681	CARBON 1/4W 680	1	
R3339		ERDS2TJ473	CARBON 1/4W 47K	1	
R3340		ERDS2TJ473	CARBON 1/4W 47K	1	
R3341		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R3342		ERDS2TJ103	CARBON 1/4W 10K	1	
R3343		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R3344		ERDS2TJ101	CARBON 1/4W 100	1	
R3345		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R3346		ERDS2TJ102	CARBON 1/4W 1K	1	
R3347		ERDS2TJ102	CARBON 1/4W 1K	1	
R3348		ERDS2TJ102	CARBON 1/4W 1K	1	
R3349		ERDS2TJ102	CARBON 1/4W 1K	1	
R3350		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R3351		ERDS2TJ102	CARBON 1/4W 1K	1	
R3352		ERDS2TJ331	CARBON 1/4W 330	1	
R3353		ERDS2TJ102	CARBON 1/4W 1K	1	
R3354		ERDS2TJ102	CARBON 1/4W 1K	1	
R3355		ERDS2TJ223	CARBON 1/4W 22K	1	
R3356		ERDS2TJ223	CARBON 1/4W 22K	1	
R3357		ERDS2TJ153	CARBON 1/4W 15K	1	
R3358		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R3359		ERDS2TJ102	CARBON 1/4W 1K	1	
R3360		ERDS2TJ561	CARBON 1/4W 560	1	
R3361		ERDS2TJ221	CARBON 1/4W 220	1	
R3362		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R3363		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R3364		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R3365		ERDS2TJ102	CARBON 1/4W 1K	1	
R3366		ERDS2TJ471	CARBON 1/4W 470	1	
R3367		ERDS2TJ561	CARBON 1/4W 560	1	
R3368		ERDS2TJ102	CARBON 1/4W 1K	1	
R3369		ERDS2TJ101	CARBON 1/4W 100	1	
R3370		ERDS2TJ223	CARBON 1/4W 22K	1	
R3371		ERDS2TJ223	CARBON 1/4W 22K	1	
R3372		ERDS2TJ221	CARBON 1/4W 220	1	
R3373		ERDS2TJ220	CARBON 1/4W 22	1	
R3374		ERDS2TJ223	CARBON 1/4W 22K	1	
R3375		ERDS2TJ223	CARBON 1/4W 22K	1	
R3376		ERDS2TJ221	CARBON 1/4W 220	1	
R3377		ERDS2TJ102	CARBON 1/4W 1K	1	
R3378		ERDS2TJ221	CARBON 1/4W 220	1	
VR3001		EVM38GA00B24	VARIABLE 20K	1	
VR3002		EVM38GA00B14	VARIABLE 10K	1	
VR3003		EVM38GA00B14	VARIABLE 10K	1	
VR3004		EVM38GA00B14	VARIABLE 10K	1	
VR3005		EVM38GA00B14	VARIABLE 10K	1	
VR3006		EVM38GA00B24	VARIABLE 20K	1	
VR3007		EVM38GA00B23	VARIABLE 2K	1	
VR3008		EVM38GA00B14	VARIABLE 10K	1	
VR3009		EVM38GA00B23	VARIABLE 2K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
VR3010		EVM38GA00B23	VARIABLE 2K	1	
VR3011		EVM38GA00B23	VARIABLE 2K	1	
VR3012		EVM38GA00B13	VARIABLE 1K	1	
VR3013		EVM38GA00B23	VARIABLE 2K	1	
VR3014		EVM38GA00B13	VARIABLE 1K	1	
VR3015		EVM38GA00B53	VARIABLE 5K	1	
VR3016		EVTK4CA00B23	VARIABLE 2K	1	
VR3017		EVM38GA00B52	VARIABLE 500	1	
VR3019		EVM38GA00B23	VARIABLE 2K	1	
VR3020		EVM38GA00B23	VARIABLE 2K	1	
VR3021		EVM38GA00B13	VARIABLE 1K	1	
VR3023		EVM38GA00B23	VARIABLE 2K	1	
X3001		VSX0222	CRYSTAL OSCILLATOR	1	
			MISCELLANEOUS		
	■	VMX0985	SPACER		
		VSC2042	SHIELD CASE (UPPER)	1	
		VSC2043	SHIELD CASE (MIDDLE)	1	
		VSC2044	SHIELD CASE (LOWER)	1	
		VJP0128	PACK PIN 5P	2	
	■	VEP04132B	NORMAL AUDIO C.B.A.		INCLUDING THE TIME CODE PACK C.B.A. (VEP00G62A),SUB AUDIO PACK (1) C.B.A. (VEP04133A),SUB AUDIO PACK (2) C.B.A. (VEP04139A)
			CAPACITORS		
C1		ECEA1EKS4R7I	ELECTROLYTIC 25V 4.7U	1	
C2		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C3		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C4		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C6		ECUX1H561KBN	CHIP 50V 560P	1	
C7		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C8		ECEA1CKS330	ELECTROLYTIC 16V 33U	1	
C9		ECEA1CKS330	ELECTROLYTIC 16V 33U	1	
C401		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C402		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C403		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C404		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C405		ECQV1H334JZ	MYLAR 50V 0.33U	1	
C406		ECEA0JK221	ELECTROLYTIC 6.3V 220U	1	
C407		ECQB1H472JZ	MYLAR 50V 4700P	1	
C408		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C409		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C410		ECQB1H472JZ	MYLAR 50V 4700P	1	
C411		ECQB1H562JZ	MYLAR 50V 5600P	1	
C412		ECQB1H273JZ	MYLAR 50V 0.027U	1	
C413		ECEA1CKN100	ELECTROLYTIC 16V 10U	1	
C414		ECEA1HKS010	ELECTROLYTIC 50V 1U	1	
C415		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C416		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C417		ECEA1CU221	ELECTROLYTIC 16V 220U	1	
C418		ECEA1CSS471	ELECTROLYTIC 16V 470U	1	
C419		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C420		ECEA10M33	ELECTROLYTIC 10V 33U	1	
C421		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C422		ECQB1H223JZ	MYLAR 50V 0.022U	1	
C423		ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C424		ECEA1CKS4R7	ELECTROLYTIC 16V 4.7U	1	
C425		ECUX1H561KBN	CHIP 50V 560P	1	
C426		ECQV1H393JZ	MYLAR 50V 0.039U	1	
C427		ECEA16M10	ELECTROLYTIC 16V 10U	1	
C428		ECEA10M33	ELECTROLYTIC 10V 33U	1	
C429		ECEA50Z2R2	ELECTROLYTIC 50V 2.2U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C430		ECEA25Z4R7	ELECTROLYTIC 25V 4.7U	1	
C431		ECUX1H102KBN	CHIP 50V 1000P	1	
C432		ECUX1H102KBN	CHIP 50V 1000P	1	
C433		ECUX1H471KBN	CHIP 50V 470P	1	
C434		ECUX1H102KBN	CHIP 50V 1000P	1	
C435		ECUX1H102KBN	CHIP 50V 1000P	1	
C436		ECEA1HKS010	ELECTROLYTIC 50V 1U	1	
C437		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C438		ECQB1H273JZ	MYLAR 50V 0.027U	1	
C451		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C452		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C453		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C454		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C455		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C458		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C459		ECEA1CU470	ELECTROLYTIC 16V 47U	1	
C460		ECEA1CU470	ELECTROLYTIC 16V 47U	1	
C461		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C463		ECEA1CU220	ELECTROLYTIC 16V 22U	1	
C464		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C465		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C4001		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C4002		ECEA1CK220	ELECTROLYTIC 16V 22U	1	
C4003		ECEA1HK4R7	ELECTROLYTIC 50V 4.7U	1	
C4004		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4005		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4006		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C4007		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4008		ECQB1H123JH	MYLAR 50V 0.012U	1	
C4009		ECQB1H392JH	MYLAR 50V 3900P	1	
C4011		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4012		ECEA1HK0R1	ELECTROLYTIC 50V 0.1U	1	
C4013		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4014		ECEA1HK0R1	ELECTROLYTIC 50V 0.1U	1	
C4015		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4016		ECQB1H123JH	MYLAR 50V 0.012U	1	
C4017		ECQB1H392JH	MYLAR 50V 3900P	1	
C4018		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4019		ECEA1HK4R7	ELECTROLYTIC 50V 4.7U	1	
C4020		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C4022		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4023		ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C4024		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C4025		ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C4026		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4027		ECKF1H102KB	CERAMIC 50V 1000P	1	
C4028		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C4029		ECQB1H822JH	MYLAR 50V 8200P	1	
C4030		ECCF1H330KC	CERAMIC 50V 33P	1	
C4031		ECEA1EK3R3	ELECTROLYTIC 25V 3.3U	1	
C4032		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C4033		ECQM2152KZ	MYLAR 100V 1500P	1	
C4034		ECQB1H223JH	MYLAR 50V 0.022U	1	
C4035		ECQB1H102KH	MYLAR 50V 1000P	1	
C4036		ECQB1H102KH	MYLAR 50V 1000P	1	
C4037		ECQB1H103KH	MYLAR 50V 0.01U	1	
C4038		ECEA1CKN100	ELECTROLYTIC 16V 10U	1	
C4039		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4040		ECQM2822KZ	MYLAR 100V 8200P	1	
C4041		ECQB1H102KH	MYLAR 50V 1000P	1	
C4042		ECQB1H152KH	MYLAR 50V 1500P	1	
C4043		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C4044		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4045		ECQB1H102KH	MYLAR 50V 1000P	1	
C4046		ECQB1H152KH	MYLAR 50V 1500P	1	
C4047		ECKD2H151KB	CERAMIC 500V 150P	1	
C4048		ECQM2152KZ	MYLAR 100V 1500P	1	
C4049		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C4050		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4051		ECQB1H102KH	MYLAR 50V 1000P	1	
C4052		ECQB1H152KH	MYLAR 50V 1500P	1	
C4053		ECKD2H151KB	CERAMIC 500V 150P	1	
C4054		ECQM2152KZ	MYLAR 100V 1500P	1	
C4055		ECEA1EKN3R3	ELECTROLYTIC 25V 3.3U	1	
C4056		ECEA1CK330	ELECTROLYTIC 16V 33U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C4057		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4058		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C4059		ECQB1H102KH	MYLAR 50V 1000P	1	
C4060		ECQB1H102KH	MYLAR 50V 1000P	1	
C4061		ECEA1CK220	ELECTROLYTIC 16V 22U	1	
C4062		ECEA1EKN3R3	ELECTROLYTIC 25V 3.3U	1	
C4063		ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C4064		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4065		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C4066		ECQB1H102KH	MYLAR 50V 1000P	1	
C4067		ECQB1H102KH	MYLAR 50V 1000P	1	
C4068		ECEA1CK220	ELECTROLYTIC 16V 22U	1	
C4069		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4070		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4071		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4072		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4073		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4074		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4075		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4076		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4080		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4089		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4090		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4091		ECEA1EK4R7	ELECTROLYTIC 25V 4.7U	1	
C4092		ECEA1EK4R7	ELECTROLYTIC 25V 4.7U	1	
C4095		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4096		ECQB1H153JH	MYLAR 50V 0.015U	1	
C4097		ECQB1H153JH	MYLAR 50V 0.015U	1	
C4098		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4099		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4100		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4101		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4102		ECQV1H124JZ	MYLAR 50V 0.12U	1	
C4103		ECQV1H124JZ	MYLAR 50V 0.12U	1	
D401		MA151WK	DIODE	1	<R>
D402		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D403		MA151WK	DIODE	1	<R>
D404		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D405		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D406		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D407		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D408		MA151K	DIODE	1	<R>
D409		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D410		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D411		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D412		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D4001		MA165	DIODE	1	<R>
D4002		MA165	DIODE	1	<R>
D4003		MA165	DIODE	1	<R>
D4004		MA165	DIODE	1	<R>
D4005		MA165	DIODE	1	<R>
D4006		MA165	DIODE	1	<R>
D4007		MA165	DIODE	1	<R>
D4008		MA165	DIODE	1	<R>
D4009		MA165	DIODE	1	<R>
D4010		MA165	DIODE	1	<R>
D4011		MA165	DIODE	1	<R>
D4012		MA165	DIODE	1	<R>
D4013		RD6.2EB	ZENER 6.2V	1	<R>
D4014		MA165	DIODE	1	<R>
D4015		OA90	DIODE	1	<R>
D4016		OA90	DIODE	1	<R>
D4017		OA90	DIODE	1	<R>
D4018		OA90	DIODE	1	<R>
D4019		MA165	DIODE	1	<R>
D4020		MA165	DIODE	1	<R>
D4021		MA165	DIODE	1	<R>
D4022		MA165	DIODE	1	<R>
D4023		MA165	DIODE	1	<R>
D4024		MA165	DIODE	1	<R>
D4025		MA4043	DIODE	1	<R>
D4026		MA4043	DIODE	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
D4028		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D4029		MA165	DIODE	1	OR 1SS119, 1SS254<R>
IC1		AN6912	IC	1	<R>
IC401		NE646N	IC	1	<R>
IC402		HA12005	IC	1	<R>
IC451		UPC4558C	IC	1	<R>
IC452		UPC4558C	IC	1	<R>
IC453		UPC4558C	IC	1	<R>
IC454		UPD4066BC	IC	1	<R>
IC4003		UPC4558C	IC	1	<R>
IC4004		AN360	IC	1	<R>
IC4005		UPD4066BC	IC	1	<R>
IC4006		UPC4558C	IC	1	<R>
IC4007		UPD4066BC	IC	1	<R>
IC4008		UPD4066BC	IC	1	<R>
IC4009		UPC4558C	IC	1	<R>
IC4011		UPC4558C	IC	1	<R>
J1		ERDS2T0	CARBON 1/4W 0	1	
J2		ERDS2T0	CARBON 1/4W 0	1	
J3		ERDS2T0	CARBON 1/4W 0	1	
J4		ERDS2T0	CARBON 1/4W 0	1	
L401		VLF0402	FILTER	1	
L4001		VLQEL06F102K	COIL 1UH	1	
L4002		VLQEL06F102K	COIL 1UH	1	
L4003		VLQEL06F102K	COIL 1UH	1	
L4004		VLQEL06F102K	COIL 1UH	1	
L4005		VLQEL06F471K	COIL 470UH	1	
L4006		VLQEL06F471K	COIL 470UH	1	
L4007		VLQ0123	COIL	1	
L4008		VLQ0123	COIL	1	
L4009		VLQEL05F471K	COIL 470UH	1	
L4010		VLQEL05F221K	COIL 220UH	1	
L4011		VLQEL05F102K	COIL 1000UH	1	
L4012		VLQEL05F102K	COIL 1000UH	1	
P4001		VJP1236T	CONNECTOR(MALE) 9P	1	
P4002		VJP1235T	CONNECTOR(MALE) 8P	1	
P4003		VJP1229T	CONNECTOR(MALE) 2P	1	
P4004		VJP1233G	CONNECTOR(MALE) 6P	1	
P4005		VJP1233T	CONNECTOR(MALE) 6P	1	
P4006		VJP1232T	CONNECTOR(MALE) 5P	1	
P4007		VJP1230T	CONNECTOR(MALE) 3P	1	
P4008		VJP1232R	CONNECTOR(MALE) 5P	1	
P4009		VJP1229	CONNECTOR(MALE) 2P	1	
P4010		VJP1230R	CONNECTOR(MALE) 3P	1	
P4011		VJP1230T	CONNECTOR(MALE) 3P	1	
P4012		VJP1230	CONNECTOR(MALE) 3P	1	
P4013		VJP1231G	CONNECTOR(MALE) 4P	1	
P4051		VJP1235R	CONNECTOR(MALE) 8P	1	
P4052		VJP1231T	CONNECTOR(MALE) 4P	1	
P4053		VJP1231R	CONNECTOR(MALE) 4P	1	
P4057		VJP1231T	CONNECTOR(MALE) 4P	1	
P4058		VJP1236T	CONNECTOR(MALE) 9P	1	
P4059		VJP1231G	CONNECTOR(MALE) 4P	1	
P4060		VJP1231T	CONNECTOR(MALE) 4P	1	
P4061		VJP1230T	CONNECTOR(MALE) 3P	1	
Q1		2SD601	TRANSISTOR CHIP	1	(Q,R)<R>
Q2		2SD601	TRANSISTOR CHIP	1	(Q,R)<R>
Q401		2SD601	TRANSISTOR CHIP	1	(Q,R)<R>
Q402		2SD601	TRANSISTOR CHIP	1	(Q,R)<R>
Q403		2SB710	TRANSISTOR CHIP	1	(Q,R)<R>

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
Q404	2SD601	TRANSISTOR CHIP	1	(Q,R)<R>
Q405	2SD1328	TRANSISTOR CHIP	1	(S,T)<R>
Q4001	2SB641	TRANSISTOR	1	(Q,R)<R>
Q4002	2SD636	TRANSISTOR	1	(Q,R)<R>
Q4003	2SD636	TRANSISTOR	1	(Q,R)<R>
Q4004	2SB643	TRANSISTOR	1	(Q,R)<R>
Q4005	2SD639	TRANSISTOR	1	(Q,R)<!><R>
Q4006	2SD639	TRANSISTOR	1	(Q,R)<!><R>
Q4007	2SB643	TRANSISTOR	1	(Q,R)<R>
Q4008	2SD639	TRANSISTOR	1	(Q,R)<!><R>
Q4009	2SB643	TRANSISTOR	1	(Q,R)<R>
Q4010	2SD639	TRANSISTOR	1	(Q,R)<!><R>
Q4011	2SB643	TRANSISTOR	1	(Q,R)<R>
Q4012	2SD639	TRANSISTOR	1	(Q,R)<!><R>
Q4013	2SB643	TRANSISTOR	1	(Q,R)<R>
Q4014	2SD639	TRANSISTOR	1	(Q,R)<!><R>
Q4015	2SB641	TRANSISTOR	1	(Q,R)<R>
Q4016	2SD973	TRANSISTOR	1	(Q,R)<!><R>
Q4017	2SD973	TRANSISTOR	1	(Q,R)<!><R>
Q4018	2SB643	TRANSISTOR	1	(Q,R)<R>
Q4019	2SD639	TRANSISTOR	1	(Q,R)<!><R>
Q4020	2SB641	TRANSISTOR	1	(Q,R)<R>
Q4021	2SD973	TRANSISTOR	1	(Q,R)<!><R>
Q4022	2SD973	TRANSISTOR	1	(Q,R)<!><R>
Q4023	2SD636	TRANSISTOR	1	(Q,R)<R>
Q4024	2SB643	TRANSISTOR	1	(Q,R)<R>
Q4025	2SD636	TRANSISTOR	1	(Q,R)<R>
QR1	UN2211	TRANSISTOR-RESISTOR	1	<R>
QR401	UN2211	TRANSISTOR-RESISTOR	1	<R>
QR402	UN2111	TRANSISTOR-RESISTOR	1	<R>
QR403	UN2213	TRANSISTOR-RESISTOR	1	<R>
QR405	UN2111	TRANSISTOR-RESISTOR	1	<R>
QR406	UN2213	TRANSISTOR-RESISTOR	1	<R>
QR407	UN2111	TRANSISTOR-RESISTOR	1	<R>
QR4001	UN1114	TRANSISTOR-RESISTOR	1	<R>
QR4002	UN1212	TRANSISTOR-RESISTOR	1	<R>
QR4003	UN1211	TRANSISTOR-RESISTOR	1	<R>
QR4004	UN1114	TRANSISTOR-RESISTOR	1	<R>
QR4005	UN1212	TRANSISTOR-RESISTOR	1	<R>
QR4006	UN1211	TRANSISTOR-RESISTOR	1	<R>
QR4007	UN1213	TRANSISTOR-RESISTOR	1	<R>
QR4008	UN1213	TRANSISTOR-RESISTOR	1	<R>
QR4009	UN1213	TRANSISTOR-RESISTOR	1	<R>
QR4013	UN1111	TRANSISTOR-RESISTOR	1	<R>
QR4015	DTC144WA	TRANSISTOR RESISTOR	1	<R>
QR4016	UN1211	TRANSISTOR-RESISTOR	1	<R>
QR4017	UN1213	TRANSISTOR-RESISTOR	1	<R>
QR4018	UN1213	TRANSISTOR-RESISTOR	1	<R>
		RESISTORS		
R01	ERJ6GEYJ563	CHIP 1/16W 56K	1	
R02	ERJ6GEYJ223	CHIP 1/16W 22K	1	
R03	ERJ6GEYJ223	CHIP 1/16W 22K	1	
R04	ERJ6GEYJ102	CHIP 1/16W 1K	1	
R05	ERJ6GEYJ122	CHIP 1/16W 1.2K	1	
R06	ERJ6GEYJ563	CHIP 1/16W 56K	1	
R07	ERJ6GEYJ223	CHIP 1/16W 22K	1	
R08	ERJ6GEYJ102	CHIP 1/16W 1K	1	
R09	ERJ6GEYJ474	CHIP 1/16W 470K	1	
R10	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R11	ERJ6GEYJ333	CHIP 1/16W 33K	1	
R12	ERJ6GEYJ562	CHIP 1/16W 5.6K	1	
R13	ERJ6GEYJ332	CHIP 1/16W 3.3K	1	
R14	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R15	ERJ6GEYJ821	CHIP 1/16W 820	1	
R16	ERJ6GEYJ560	CHIP 1/16W 56	1	
R17	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R18	ERJ6GEYJ105	CHIP 1/16W 1M	1	
R19	ERJ6GEYJ332	CHIP 1/16W 3.3K	1	
R20	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R21	ERJ6GEYJ105	CHIP 1/16W 1M	1	
R22	ERJ6GEYJ332	CHIP 1/16W 3.3K	1	
R23	ERJ6GEYJ223	CHIP 1/16W 22K	1	

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
R24	ERJ6GEYJ223	CHIP 1/16W 22K	1	
R25	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R26	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R27	ERJ6GEYJ332	CHIP 1/16W 3.3K	1	
R28	ERJ6GEYJ223	CHIP 1/16W 22K	1	
R29	ERJ6GEYJ564	CHIP 1/16W 560K	1	
R30	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R31	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R401	ERJ6GEYJ682	CHIP 1/16W 6.8K	1	
R402	ERJ6GEYJ154	CHIP 1/16W 150K	1	
R403	ERJ6GEYJ682	CHIP 1/16W 6.8K	1	
R404	ERJ6GEYJ221	CHIP 1/16W 220	1	
R405	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R406	ERJ6GEYJ562	CHIP 1/16W 5.6K	1	
R407	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R408	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R409	ERJ6GEYJ393	CHIP 1/16W 39K	1	
R410	ERJ6GEYJ562	CHIP 1/16W 5.6K	1	
R411	ERJ6GEYJ562	CHIP 1/16W 5.6K	1	
R412	ERJ6GEYJ393	CHIP 1/16W 39K	1	
R413	ERJ6GEYJ224	CHIP 1/16W 220K	1	
R414	ERJ6GEYJ105	CHIP 1/16W 1M	1	
R415	ERJ6GEYJ102	CHIP 1/16W 1K	1	
R416	ERJ6GEYJ222	CHIP 1/16W 2.2K	1	
R417	ERJ6GEYJ472	CHIP 1/16W 4.7K	1	
R418	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R419	ERJ6GEYJ331	CHIP 1/16W 330	1	
R420	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R421	ERJ6GEYJ824	CHIP 1/16W 820K	1	
R422	ERJ6GEYJ561	CHIP 1/16W 560	1	
R423	ERJ6GEYJ182	CHIP 1/16W 1.8K	1	
R424	ERJ6GEYJ333	CHIP 1/16W 33K	1	
R425	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R426	ERJ6GEYJ181	CHIP 1/16W 180	1	
R427	ERJ6GEYJ473	CHIP 1/16W 47K	1	
R428	ERJ6GEYJ332	CHIP 1/16W 3.3K	1	
R429	ERJ6GEYJ102	CHIP 1/16W 1K	1	
R430	ERJ6GEYJ102	CHIP 1/16W 1K	1	
R431	ERJ6GEYJ102	CHIP 1/16W 1K	1	
R432	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R433	ERJ6GEYJ184	CHIP 1/16W 180K	1	
R434	ERJ6GEYJ274	CHIP 1/16W 270K	1	
R435	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R436	ERJ6GEYJ102	CHIP 1/16W 1K	1	
R437	ERJ6GEYJ472	CHIP 1/16W 4.7K	1	
R438	ERJ6GEYJ472	CHIP 1/16W 4.7K	1	
R439	ERJ6GEYJ562	CHIP 1/16W 5.6K	1	
R440	ERJ6GEYJ822	CHIP 1/16W 8.2K	1	
R441	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R442	ERJ6GEYJ562	CHIP 1/16W 5.6K	1	
R451	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R452	ERJ6GEYJ561	CHIP 1/16W 560	1	
R453	ERJ6GEYJ331	CHIP 1/16W 330	1	
R454	ERDS2TJ822	CARBON 1/4W 8.2K	1	
R455	ERJ6GEYJ272	CHIP 1/16W 2.7K	1	
R456	ERJ6GEYJ102	CHIP 1/16W 1K	1	
R457	ERJ6GEYJ102	CHIP 1/16W 1K	1	
R458	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R459	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R460	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R461	ERJ6GEYJ223	CHIP 1/16W 22K	1	
R462	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R463	ERJ6GEYJ103	CHIP 1/16W 10K	1	
R464	ERJ6GEYJ272	CHIP 1/16W 2.7K	1	
R465	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R466	ERJ6GEYJ104	CHIP 1/16W 100K	1	
R467	ERDS2TJ822	CARBON 1/4W 8.2K	1	
R468	ERJ6GEYJ223	CHIP 1/16W 22K	1	
R469	ERJ6GEYJ223	CHIP 1/16W 22K	1	
R470	ERJ6GEYJ223	CHIP 1/16W 22K	1	
R471	ERJ6GEYJ273	CHIP 1/16W 27K	1	
R472	ERJ6GEYJ273	CHIP 1/16W 27K	1	
R473	ERJ6GEYJ273	CHIP 1/16W 27K	1	
R474	ERJ6GEYJ273	CHIP 1/16W 27K	1	
R475	ERDS2TJ822	CARBON 1/4W 8.2K	1	

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
R476	ERJ6GEYJ272	CHIP 1/16W 2.7K	1	
R477	ERDS2TJ822	CARBON 1/4W 8.2K	1	
R478	ERJ6GEYJ272	CHIP 1/16W 2.7K	1	
R4001	ERDS2TJ563	CARBON 1/4W 56K	1	
R4002	ERDS2TJ104	CARBON 1/4W 100K	1	
R4005	ERDS2TJ222	CARBON 1/4W 2.2K	1	
R4006	ERDS2TJ104	CARBON 1/4W 100K	1	
R4007	ERDS2TJ123	CARBON 1/4W 12K	1	
R4008	ERDS2TJ103	CARBON 1/4W 10K	1	
R4009	ERDS2TJ103	CARBON 1/4W 10K	1	
R4010	ERDS2TJ103	CARBON 1/4W 10K	1	
R4011	ERDS2TJ183	CARBON 1/4W 18K	1	
R4012	ERDS2TJ104	CARBON 1/4W 100K	1	
R4013	ERDS2TJ223	CARBON 1/4W 22K	1	
R4014	ERDS2TJ223	CARBON 1/4W 22K	1	
R4015	ERDS2TJ151	CARBON 1/4W 150	1	
R4016	ERDS2TJ182	CARBON 1/4W 1.8K	1	
R4017	ERDS2TJ473	CARBON 1/4W 47K	1	
R4018	ERDS2TJ222	CARBON 1/4W 2.2K	1	
R4019	ERDS2TJ104	CARBON 1/4W 100K	1	
R4021	ERDS2TJ223	CARBON 1/4W 22K	1	
R4022	ERDS2TJ223	CARBON 1/4W 22K	1	
R4023	ERDS2TJ151	CARBON 1/4W 150	1	
R4024	ERDS2TJ182	CARBON 1/4W 1.8K	1	
R4025	ERDS2TJ473	CARBON 1/4W 47K	1	
R4026	ERDS2TJ104	CARBON 1/4W 100K	1	
R4027	ERDS2TJ183	CARBON 1/4W 18K	1	
R4029	ERDS2TJ183	CARBON 1/4W 18K	1	
R4030	ERDS2TJ822	CARBON 1/4W 8.2K	1	
R4032	ERDS2TJ562	CARBON 1/4W 5.6K	1	
R4033	ERDS2TJ103	CARBON 1/4W 10K	1	
R4034	ERDS2TJ103	CARBON 1/4W 10K	1	
R4035	ERDS2TJ332	CARBON 1/4W 3.3K	1	
R4037	ERDS2TJ102	CARBON 1/4W 1K	1	
R4038	ERDS2TJ472	CARBON 1/4W 4.7K	1	
R4039	ERDS2TJ563	CARBON 1/4W 56K	1	
R4040	ERDS2TJ560	CARBON 1/4W 56	1	
R4041	ERDS2TJ121	CARBON 1/4W 120	1	
R4042	ERDS2TJ562	CARBON 1/4W 5.6K	1	
R4043	ERDS2TJ123	CARBON 1/4W 12K	1	
R4044	ERDS2TJ562	CARBON 1/4W 5.6K	1	
R4045	ERDS2TJ220	CARBON 1/4W 22	1	
R4046	ERDS2TJ333	CARBON 1/4W 33K	1	
R4047	ERDS2TJ681	CARBON 1/4W 680	1	
R4048	ERDS2TJ392	CARBON 1/4W 3.9K	1	
R4049	ERDS2TJ333	CARBON 1/4W 33K	1	
R4050	ERDS2TJ103	CARBON 1/4W 10K	1	
R4051	ERDS2TJ180	CARBON 1/4W 18	1	
R4052	ERDS2TJ102	CARBON 1/4W 1K	1	
R4053	ERDS2TJ822	CARBON 1/4W 8.2K	1	
R4054	ERDS2TJ563	CARBON 1/4W 56K	1	
R4055	ERDS2TJ682	CARBON 1/4W 6.8K	1	
R4056	ERDS2TJ330	CARBON 1/4W 33	1	
R4057	ERDS2TJ102	CARBON 1/4W 1K	1	
R4058	ERDS2TJ822	CARBON 1/4W 8.2K	1	
R4059	ERDS2TJ563	CARBON 1/4W 56K	1	
R4060	ERDS2TJ682	CARBON 1/4W 6.8K	1	
R4061	ERDS2TJ330	CARBON 1/4W 33	1	
R4062	ERDS2TJ152	CARBON 1/4W 1.5K	1	
R4063	ERDS2TJ332	CARBON 1/4W 3.3K	1	
R4064	ERDS2TJ223	CARBON 1/4W 22K	1	
R4065	ERDS2TJ682	CARBON 1/4W 6.8K	1	
R4066	ERDS1TJ180	CARBON 1/2W 18	1	
R4067	ERDS2TJ223	CARBON 1/4W 22K	1	
R4068	ERDS2TJ153	CARBON 1/4W 15K	1	
R4069	ERDS2TJ122	CARBON 1/4W 1.2K	1	
R4070	ERDS2TJ103	CARBON 1/4W 10K	1	
R4071	ERDS2TJ103	CARBON 1/4W 10K	1	
R4072	ERDS2TJ122	CARBON 1/4W 1.2K	1	
R4073	ERDS2TJ152	CARBON 1/4W 1.5K	1	
R4074	ERDS2TJ332	CARBON 1/4W 3.3K	1	
R4075	ERDS2TJ223	CARBON 1/4W 22K	1	
R4076	ERDS2TJ682	CARBON 1/4W 6.8K	1	
R4077	ERDS1TJ180	CARBON 1/2W 18	1	
R4078	ERDS2TJ223	CARBON 1/4W 22K	1	

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
R4079	ERDS2TJ153	CARBON 1/4W 15K	1	
R4080	ERDS2TJ103	CARBON 1/4W 10K	1	
R4081	ERDS2TJ122	CARBON 1/4W 1.2K	1	
R4082	ERDS2TJ103	CARBON 1/4W 10K	1	
R4083	ERDS2TJ122	CARBON 1/4W 1.2K	1	
R4084	ERDS2TJ102	CARBON 1/4W 1K	1	
R4085	ERDS2TJ102	CARBON 1/4W 1K	1	
R4086	ERDS2TJ104	CARBON 1/4W 100K	1	
R4087	ERDS2TJ104	CARBON 1/4W 100K	1	
R4088	ERDS2TJ104	CARBON 1/4W 100K	1	
R4089	ERDS2TJ104	CARBON 1/4W 100K	1	
R4090	ERDS2TJ392	CARBON 1/4W 3.9K	1	
R4091	ERDS2TJ332	CARBON 1/4W 3.3K	1	
R4092	ERDS2TJ392	CARBON 1/4W 3.9K	1	
R4093	ERDS2TJ332	CARBON 1/4W 3.3K	1	
R4094	ERDS2TJ103	CARBON 1/4W 10K	1	
R4095	ERDS2TJ103	CARBON 1/4W 10K	1	
R4096	ERDS2TJ103	CARBON 1/4W 10K	1	
R4097	ERDS2TJ103	CARBON 1/4W 10K	1	
R4098	ERDS2TJ103	CARBON 1/4W 10K	1	
R4099	ERDS2TJ103	CARBON 1/4W 10K	1	
R4100	ERDS2TJ104	CARBON 1/4W 100K	1	
R4101	ERDS2TJ103	CARBON 1/4W 10K	1	
R4102	ERDS2TJ104	CARBON 1/4W 100K	1	
R4103	ERDS2TJ473	CARBON 1/4W 47K	1	
R4113	ERDS2TJ393	CARBON 1/4W 39K	1	
R4114	ERDS2TJ393	CARBON 1/4W 39K	1	
R4115	ERDS2TJ123	CARBON 1/4W 12K	1	
R4123	ERDS2TJ103	CARBON 1/4W 10K	1	
R4124	ERDS2TJ103	CARBON 1/4W 10K	1	
R4125	ERDS2TJ473	CARBON 1/4W 47K	1	
R4126	ERDS2TJ123	CARBON 1/4W 12K	1	
R4127	ERDS2TJ222	CARBON 1/4W 2.2K	1	
R4128	ERDS2TJ123	CARBON 1/4W 12K	1	
R4129	ERDS2TJ222	CARBON 1/4W 2.2K	1	
R4130	ERDS2TJ104	CARBON 1/4W 100K	1	
R4131	ERDS2TJ104	CARBON 1/4W 100K	1	
R4132	ERDS2TJ223	CARBON 1/4W 22K	1	
R4133	ERDS2TJ563	CARBON 1/4W 56K	1	
R4134	ERDS2TJ2R2	CARBON 1/4W 2.2	1	
R4135	ERDS2TJ2R2	CARBON 1/4W 2.2	1	
R4136	ERDS2TJ2R2	CARBON 1/4W 2.2	1	
R4137	ERDS2TJ102	CARBON 1/4W 1K	1	
R4138	ERDS2TJ102	CARBON 1/4W 1K	1	
R4139	ERDS2TJ2R2	CARBON 1/4W 2.2	1	
R4140	ERDS2TJ223	CARBON 1/4W 22K	1	
R4141	ERDS2TJ223	CARBON 1/4W 22K	1	
S4001	ERDS2T0	CARBON 1/4W 0	1	
S4002	ERDS2T0	CARBON 1/4W 0	1	
RY4001	VSY2035	RELAY	1	
RY4002	VSY1015	RELAY	1	
RY4003	VSY1015	RELAY	1	
T4001	VLT0143	TRANSFORMER	1	
T4002	VLT0144	TRANSFORMER	1	
T4003	VLT0146	TRANSFORMER	1	
T4004	VLT0146	TRANSFORMER	1	
T4005	VLT0145	TRANSFORMER	1	
T4006	VLT0145	TRANSFORMER	1	
VR4001	EVN38CA00B53	VARIABLE 5K	1	
VR4002	EVN38CA00B24	VARIABLE 20K	1	
VR4003	EVN38CA00B53	VARIABLE 5K	1	
VR4004	EVN38CA00B53	VARIABLE 5K	1	
VR4005	EVN38CA00B24	VARIABLE 20K	1	
VR4006	EVN38CA00B53	VARIABLE 5K	1	
VR4007	EVN38CA00B53	VARIABLE 5K	1	
VR4009	EVN38CA00B53	VARIABLE 5K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
VR4010		EVN38CA00B53	VARIABLE 5K	1	
			MISCELLANEOUS		
		VSC1706	SHIELD CASE (UPPER)	1	
		VSC1707	SHIELD CASE (MIDDLE)	1	
		VSC1708	SHIELD CASE (LOWER)	1	
		VMP0902	SUPPORT	1	
		VJR0163	PACK PIN 9P	1	
		VJR0128	PACK PIN 5P	3	
		VJR0130	PACK PIN 12P	1	
		VJR0161	PACK PIN	1	
	■	VEP04134B1	HD AUDIO C.B.A.		
			CAPACITORS		
C4301		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4302		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4303		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4304		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4305		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4306		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4307		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4308		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C4309		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C4310		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4311		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C4312		ECEA1EK4R7	ELECTROLYTIC 25V 4.7U	1	
C4313		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4314		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C4315		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C4316		ECEA1EK3R3	ELECTROLYTIC 25V 3.3U	1	
C4317		ECEA1EK3R3	ELECTROLYTIC 25V 3.3U	1	
C4318		ECEA1EK3R3	ELECTROLYTIC 25V 3.3U	1	
C4319		ECEA1EK3R3	ELECTROLYTIC 25V 3.3U	1	
C4320		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4321		ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C4322		ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C4323		ECCF1H330KC	CERAMIC 50V 33P	1	
C4324		ECCF1H330KC	CERAMIC 50V 33P	1	
C4325		ECEA1AK101	ELECTROLYTIC 10V 100U	1	
C4326		ECEA1EK3R3	ELECTROLYTIC 25V 3.3U	1	
C4327		ECEA1EK3R3	ELECTROLYTIC 25V 3.3U	1	
C4328		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4329		ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C4330		ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C4331		ECQB1H102KH	MYLAR 50V 1000P	1	
C4332		ECQB1H222KH	MYLAR 50V 2200P	1	
C4333		ECQB1H102KH	MYLAR 50V 1000P	1	
C4334		ECQB1H103KH	MYLAR 50V 0.01U	1	
C4335		ECQB1H103JH	MYLAR 50V 0.01U	1	
C4336		ECEA1CKN100	ELECTROLYTIC 16V 10U	1	
C4337		ECEA0JKN470	ELECTROLYTIC 6.3V 47U	1	
C4338		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4339		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4340		ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C4341		ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C4342		ECQB1H102KH	MYLAR 50V 1000P	1	
C4343		ECQB1H222KH	MYLAR 50V 2200P	1	
C4344		ECEA1EK3R3	ELECTROLYTIC 25V 3.3U	1	
C4345		ECQB1H222JH	MYLAR 50V 2200P	1	
C4346		ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C4347		ECEA25Z4R7	ELECTROLYTIC 25V 4.7U	1	
C4348		ECQB1H223JH	MYLAR 50V 0.022U	1	
C4349		ECEA16Z10	ELECTROLYTIC 16V 10U	1	
C4350		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4351		ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C4352		ECEA1AK470	ELECTROLYTIC 10V 47U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C4353		ECQB1H102KH	MYLAR 50V 1000P	1	
C4354		ECQB1H102KH	MYLAR 50V 1000P	1	
C4355		ECQB1H222KH	MYLAR 50V 2200P	1	
C4356		ECQB1H103KH	MYLAR 50V 0.01U	1	
C4357		ECQB1H103JH	MYLAR 50V 0.01U	1	
C4358		ECEA1CKN100	ELECTROLYTIC 16V 10U	1	
C4359		ECEA0JKN470	ELECTROLYTIC 6.3V 47U	1	
C4360		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4361		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4362		ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C4363		ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C4364		ECQB1H102KH	MYLAR 50V 1000P	1	
C4365		ECQB1H222KH	MYLAR 50V 2200P	1	
C4366		ECEA1EK3R3	ELECTROLYTIC 25V 3.3U	1	
C4367		ECQB1H222JH	MYLAR 50V 2200P	1	
C4368		ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C4369		ECQB1H223JH	MYLAR 50V 0.022U	1	
C4370		ECEA25Z4R7	ELECTROLYTIC 25V 4.7U	1	
C4371		ECEA16Z10	ELECTROLYTIC 16V 10U	1	
C4372		ECCF1H101KC	CERAMIC 50V 100P	1	
C4373		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4374		ECEA1AK220	ELECTROLYTIC 10V 22U	1	
C4375		ECCF1H820K	CERAMIC 50V 82P	1	
C4376		ECCF1H680K	CERAMIC 50V 68P	1	
C4377		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4378		ECCF1H680K	CERAMIC 50V 68P	1	
C4379		ECCF1H470K	CERAMIC 50V 47P	1	
C4380		ECCF1H470K	CERAMIC 50V 47P	1	
C4381		ECKF1H561KB	CERAMIC 50V 560P	1	
C4382		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4383		ECEA0JK220	ELECTROLYTIC 6.3V 22U	1	
C4384		ECQB1H222KH	MYLAR 50V 2200P	1	
C4385		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4386		ECEA1EKN3R3	ELECTROLYTIC 25V 3.3U	1	
C4387		ECKF1H561KB	CERAMIC 50V 560P	1	
C4388		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C4389		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4390		ECQB1H272KH	MYLAR 50V 2700P	1	
C4391		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C4392		ECCF1H101KC	CERAMIC 50V 100P	1	
C4393		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4394		ECEA1AK220	ELECTROLYTIC 10V 22U	1	
C4395		ECCF1H820K	CERAMIC 50V 82P	1	
C4396		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4397		ECKF1H561KB	CERAMIC 50V 560P	1	
C4398		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4399		ECEA0JK220	ELECTROLYTIC 6.3V 22U	1	
C4400		ECQB1H222KH	MYLAR 50V 2200P	1	
C4401		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4402		ECEA1EKN3R3	ELECTROLYTIC 25V 3.3U	1	
C4403		ECKF1H561KB	CERAMIC 50V 560P	1	
C4404		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C4405		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4406		ECQB1H272KH	MYLAR 50V 2700P	1	
C4407		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C4408		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4409		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4410		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4411		ECEA1EK4R7	ELECTROLYTIC 25V 4.7U	1	
C4412		ECQV1H104JZ	MYLAR 50V 0.1U	1	
D4301		MA165	DIODE	1	<R>
D4302		MA165	DIODE	1	<R>
D4303		MA4056M	DIODE	1	<R>
D4304		MA165	DIODE	1	<R>
D4305		MA165	DIODE	1	<R>
D4306		MA165	DIODE	1	<R>
D4307		1S1007	DIODE	1	<R>
D4308		1S1007	DIODE	1	<R>
D4309		MA165	DIODE	1	<R>
D4310		MA165	DIODE	1	<R>
D4311		MA165	DIODE	1	<R>
D4312		MA165	DIODE	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
D4313		MA165	DIODE	1	<R>
D4314		MA165	DIODE	1	<R>
D4315		MA165	DIODE	1	<R>
D4316		MA165	DIODE	1	<R>
D4317		MA165	DIODE	1	<R>
D4318		MA165	DIODE	1	<R>
D4319		MA165	DIODE	1	<R>
D4320		MA165	DIODE	1	<R>
D4321		MA165	DIODE	1	<R>
D4322		MA165	DIODE	1	<R>
D4323		MA165	DIODE	1	<R>
D4324		MA165	DIODE	1	<R>
IC4301		UPC4558C	IC	1	<R>
IC4302		NJM4556D	IC	1	<R>
IC4303		NJM4556D	IC	1	<R>
IC4304		AN6298NK	IC	1	<R>
IC4305		AN6298NK	IC	1	<R>
IC4306		AN3922K	IC	1	<R>
IC4307		AN3922K	IC	1	<R>
L4301		VLQEL05F221K	COIL 220UH	1	
L4302		VLQEL05F221K	COIL 220UH	1	
L4303		VLQEL05F101K	COIL 100UH	1	
L4304		VLQEL05F101K	COIL 100UH	1	
L4305		VLQEL05F121K	COIL 120UH	1	
L4306		VLQEL05F101K	COIL 100UH	1	
L4307		VLQEL05F221K	COIL 220UH	1	
L4308		VLQ0199	COIL	1	
P4301		VJP1231T	CONNECTOR(MALE) 4P	1	
P4302		VJP1231R	CONNECTOR(MALE) 4P	1	
P4303		VJP1231T	CONNECTOR(MALE) 4P	1	
P4304		VJP1230T	CONNECTOR(MALE) 3P	1	
P4305		VJP1229T	CONNECTOR(MALE) 2P	1	
P4306		VJP1229	CONNECTOR(MALE) 2P	1	
P4307		VJP1237T	CONNECTOR(MALE) 10P	1	
P4308		VJP1229T	CONNECTOR(MALE) 2P	1	
P4309		VJP1231G	CONNECTOR(MALE) 4P	1	
Q4301		2SB641	TRANSISTOR	1	(Q,R)<R>
Q4302		2SD636	TRANSISTOR	1	(Q,R)<R>
Q4303		2SD636	TRANSISTOR	1	(Q,R)<R>
Q4304		2SD1330	TRANSISTOR	1	(S,T)<R>
Q4305		2SD636	TRANSISTOR	1	(Q,R)<R>
Q4306		2SD636	TRANSISTOR	1	(Q,R)<R>
Q4307		2SD973	TRANSISTOR	1	(Q,R,S)<!><R>
Q4308		2SD636	TRANSISTOR	1	(Q,R)<R>
Q4309		2SB819	TRANSISTOR	1	(Q,R)<R>
Q4310		2SB819	TRANSISTOR	1	(Q,R)<R>
Q4311		2SB641	TRANSISTOR	1	(Q,R)<R>
Q4312		2SB641	TRANSISTOR	1	(Q,R)<R>
Q4313		2SD636	TRANSISTOR	1	(Q,R)<R>
Q4314		2SD1330	TRANSISTOR	1	(S,T)<R>
Q4315		2SD1330	TRANSISTOR	1	(S,T)<R>
Q4316		2SD636	TRANSISTOR	1	(Q,R)<R>
Q4317		2SB641	TRANSISTOR	1	(Q,R)<R>
Q4318		2SB641	TRANSISTOR	1	(Q,R)<R>
QR4301		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR4302		DTC144WA	TRANSISTOR RESISTOR	1	<R>
QR4303		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR4304		UN1212	TRANSISTOR-RESISTOR	1	<R>
QR4305		UN1112	TRANSISTOR-RESISTOR	1	<R>
QR4306		UN1113	TRANSISTOR-RESISTOR	1	<R>
QR4307		DTC144WA	TRANSISTOR RESISTOR	1	<R>
QR4308		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR4309		DTC144WA	TRANSISTOR RESISTOR	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
QR4310		DTC144WA	TRANSISTOR RESISTOR	1	<R>
QR4311		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR4312		DTC144WA	TRANSISTOR RESISTOR	1	<R>
QR4313		UN1111	TRANSISTOR-RESISTOR	1	<R>
QR4314		DTC144WA	TRANSISTOR RESISTOR	1	<R>
			RESISTORS		
R4301		ERDS2TJ104	CARBON 1/4W 100K	1	
R4302		ERDS2TJ104	CARBON 1/4W 100K	1	
R4303		ERDS2TJ183	CARBON 1/4W 18K	1	
R4304		ERDS2TJ103	CARBON 1/4W 10K	1	
R4305		ERDS2TJ183	CARBON 1/4W 18K	1	
R4306		ERDS2TJ103	CARBON 1/4W 10K	1	
R4307		ERDS2TJ473	CARBON 1/4W 47K	1	
R4308		ERDS2TJ223	CARBON 1/4W 22K	1	
R4309		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R4310		ERDS2TJ103	CARBON 1/4W 10K	1	
R4311		ERDS2TJ102	CARBON 1/4W 1K	1	
R4312		ERDS2TJ273	CARBON 1/4W 27K	1	
R4313		ERDS2TJ103	CARBON 1/4W 10K	1	
R4314		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R4315		ERDS2TJ103	CARBON 1/4W 10K	1	
R4316		ERDS2TJ223	CARBON 1/4W 22K	1	
R4317		ERDS2TJ103	CARBON 1/4W 10K	1	
R4318		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R4319		ERDS2TJ103	CARBON 1/4W 10K	1	
R4320		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R4321		ERDS2TJ103	CARBON 1/4W 10K	1	
R4322		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R4323		ERDS2TJ103	CARBON 1/4W 10K	1	
R4324		ERDS2TJ563	CARBON 1/4W 56K	1	
R4325		ERDS2TJ223	CARBON 1/4W 22K	1	
R4326		ERDS2TJ103	CARBON 1/4W 10K	1	
R4327		ERDS2TJ823	CARBON 1/4W 82K	1	
R4328		ERDS2TJ473	CARBON 1/4W 47K	1	
R4329		ERDS2TJ473	CARBON 1/4W 47K	1	
R4330		ERDS2TJ104	CARBON 1/4W 100K	1	
R4331		ERDS2TJ104	CARBON 1/4W 100K	1	
R4332		ERDS2TJ102	CARBON 1/4W 1K	1	
R4333		ERDS2TJ473	CARBON 1/4W 47K	1	
R4334		ERDS2TJ102	CARBON 1/4W 1K	1	
R4335		ERDS2TJ473	CARBON 1/4W 47K	1	
R4336		ERDS2TJ102	CARBON 1/4W 1K	1	
R4337		ERDS2TJ102	CARBON 1/4W 1K	1	
R4338		ERDS2TJ104	CARBON 1/4W 100K	1	
R4339		ERDS2TJ104	CARBON 1/4W 100K	1	
R4340		ERDS2TJ273	CARBON 1/4W 27K	1	
R4341		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R4342		ERDS2TJ273	CARBON 1/4W 27K	1	
R4343		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R4344		ERDS2TJ563	CARBON 1/4W 56K	1	
R4345		ERDS2TJ104	CARBON 1/4W 100K	1	
R4346		ERDS2TJ563	CARBON 1/4W 56K	1	
R4347		ERDS2TJ103	CARBON 1/4W 10K	1	
R4348		ERDS2TJ103	CARBON 1/4W 10K	1	
R4349		ERDS2TJ223	CARBON 1/4W 22K	1	
R4350		ERDS2TJ223	CARBON 1/4W 22K	1	
R4351		ERDS2TJ102	CARBON 1/4W 1K	1	
R4352		ERDS2TJ103	CARBON 1/4W 10K	1	
R4353		ERDS2TJ223	CARBON 1/4W 22K	1	
R4354		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R4355		EROS2CKG6201	METAL OXIDE 1/4W 6.2K	1	
R4356		ERDS2TJ681	CARBON 1/4W 680	1	
R4357		EROS2CKG2401	METAL OXIDE 1/4W 2.4K	1	
R4358		EROS2CKG1802	METAL OXIDE 1/4W 18K	1	
R4359		EROS2CKG5601	METAL OXIDE 1/4W 5.6K	1	
R4360		ERDS2TJ473	CARBON 1/4W 47K	1	
R4361		ERDS2TJ473	CARBON 1/4W 47K	1	
R4362		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R4363		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R4364		EROS2CKG1302	METAL OXIDE 1/4W 13K	1	
R4365		EROS2CKG9101	METAL OXIDE 1/4W 9.1K	1	
R4366		ERDS2TJ152	CARBON 1/4W 1.5K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R4367		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R4368		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R4369		ERDS2TJ102	CARBON 1/4W 1K	1	
R4370		ERDS2TJ471	CARBON 1/4W 470	1	
R4371		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R4372		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R4373		ERDS2TJ102	CARBON 1/4W 1K	1	
R4374		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R4375		ERDS2TJ183	CARBON 1/4W 18K	1	
R4376		ERDS2TJ101	CARBON 1/4W 100	1	
R4377		ERDS2TJ123	CARBON 1/4W 12K	1	
R4378		ERDS2TJ473	CARBON 1/4W 47K	1	
R4379		ERDS2TJ103	CARBON 1/4W 10K	1	
R4380		ERDS2TJ103	CARBON 1/4W 10K	1	
R4381		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R4382		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R4383		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R4384		EROS2CKG6201	METAL OXIDE 1/4W 6.2K	1	
R4385		ERDS2TJ681	CARBON 1/4W 680	1	
R4386		EROS2CKG2401	METAL OXIDE 1/4W 2.4K	1	
R4387		EROS2CKG5601	METAL OXIDE 1/4W 5.6K	1	
R4388		EROS2CKG1802	METAL OXIDE 1/4W 18K	1	
R4389		ERDS2TJ473	CARBON 1/4W 47K	1	
R4390		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R4391		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R4392		EROS2CKG1302	METAL OXIDE 1/4W 13K	1	
R4393		EROS2CKG9101	METAL OXIDE 1/4W 9.1K	1	
R4394		EROS2CKG1101	METAL OXIDE 1/4W 1.1K	1	
R4395		EROS2CKG1002	METAL OXIDE 1/4W 10K	1	
R4396		ERDS2TJ223	CARBON 1/4W 22K	1	
R4397		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R4398		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R4399		ERDS2TJ473	CARBON 1/4W 47K	1	
R4400		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R4401		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R4402		ERDS2TJ183	CARBON 1/4W 18K	1	
R4403		ERDS2TJ101	CARBON 1/4W 100	1	
R4404		ERDS2TJ123	CARBON 1/4W 12K	1	
R4405		ERDS2TJ473	CARBON 1/4W 47K	1	
R4406		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R4407		ERDS2TJ393	CARBON 1/4W 39K	1	
R4408		ERDS2TJ155	CARBON 1/4W 1.5M	1	
R4409		ERDS2TJ223	CARBON 1/4W 22K	1	
R4410		EROS2CKG1101	METAL OXIDE 1/4W 1.1K	1	
R4411		EROS2CKG1002	METAL OXIDE 1/4W 10K	1	
R4412		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R4413		ERDS2TJ473	CARBON 1/4W 47K	1	
R4414		ERDS2TJ223	CARBON 1/4W 22K	1	
R4415		ERDS2TJ181	CARBON 1/4W 180	1	
R4416		ERDS2TJ181	CARBON 1/4W 180	1	
R4417		ERDS2TJ104	CARBON 1/4W 100K	1	
R4418		ERDS2TJ102	CARBON 1/4W 1K	1	
R4419		ERDS2TJ181	CARBON 1/4W 180	1	
R4420		ERDS2TJ181	CARBON 1/4W 180	1	
R4421		ERDS2TJ104	CARBON 1/4W 100K	1	
R4422		ERDS2TJ102	CARBON 1/4W 1K	1	
R4423		ERDS2TJ103	CARBON 1/4W 10K	1	
R4425		ERDS2TJ471	CARBON 1/4W 470	1	
R4426		ERDS2TJ473	CARBON 1/4W 47K	1	
R4427		ERX12ANJ1R8	METAL OXIDE 1/2W 1.8	1	
VR4301		EVN38CA00B53	VARIABLE 5K	1	
VR4302		EVN38CA00B14	VARIABLE 10K	1	
VR4303		EVN38CA00B23	VARIABLE 2K	1	
VR4304		EVN38CA00B52	VARIABLE 500	1	
VR4305		EVN38CA00B13	VARIABLE 1K	1	
VR4306		EVN38CA00B53	VARIABLE 5K	1	
VR4307		EVN38CA00B14	VARIABLE 10K	1	
VR4308		EVN38CA00B23	VARIABLE 2K	1	
			MISCELLANEOUS		

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
		VMP0903	SUPPORT	1	
		VSC1799	SHIELD PLATE	1	
	■	VEP04135B1	HD AUDIO HEAD AMP C.B.A.		
			CAPACITORS		
C4801		ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C4802		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4803		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4804		ECCF1H100DC	CERAMIC 50V 10P	1	
C4805		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4806		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4807		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4808		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4809		VCYD1C104MR1	SEMICONDUCTOR 16V 0.1U	1	
C4810		ECCF1H560K	CERAMIC 50V 56P	1	
C4811		ECCF1H560K	CERAMIC 50V 56P	1	
C4812		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4813		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4814		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4815		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4816		ECEA0JK330	ELECTROLYTIC 6.3V 33U	1	
C4817		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4818		ECKF1H102KB	CERAMIC 50V 1000P	1	
C4819		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4820		ECCF1H221JC	CERAMIC 50V 220P	1	
C4821		ECKF1H331KB	CERAMIC 50V 330P	1	
C4822		ECQB1H682KH	MYLAR 50V 6800P	1	
C4823		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4824		ECEA1HK0R1	ELECTROLYTIC 50V 0.1U	1	
C4825		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4826		ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C4827		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4828		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4829		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C4830		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4831		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C4832		ECEA0JK220	ELECTROLYTIC 6.3V 22U	1	
FL4801		VLF0493	FILTER	1	
IC4801		UPC1531HA	IC	1	<R>
IC4802		AN3920K	IC	1	<R>
L4801		VLQEL05F101K	COIL 100UH	1	
L4802		VLQEL05F101K	COIL 100UH	1	
L4803		VLQEL05F101K	COIL 100UH	1	
L4804		VLP0017	COIL	1	
L4805		VLP0017	COIL	1	
L4806		VLQEL05F101K	COIL 100UH	1	
P4801		VJP1237T	CONNECTOR(MALE) 10P	1	
P4802		VJP1233T	CONNECTOR(MALE) 6P	1	
P4803		VJP1229	CONNECTOR(MALE) 2P	1	
P4804		VJP1229T	CONNECTOR(MALE) 2P	1	
Q4801		2SC2377	TRANSISTOR	1	(C,D)<R>
Q4802		2SC2377	TRANSISTOR	1	(C,D)<R>
Q4803		2SD636	TRANSISTOR	1	(Q,R)<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
Q4804		2SB641	TRANSISTOR	1	(Q,R)<R>
Q4805		2SD636	TRANSISTOR	1	(Q,R)<R>
Q4806		2SD638	TRANSISTOR	1	(Q,R)<R>
Q4807		2SD638	TRANSISTOR	1	(Q,R)<R>
Q4808		2SD638	TRANSISTOR	1	(Q,R)<R>
Q4809		2SD636	TRANSISTOR	1	(Q,R)<R>
Q4810		2SD636	TRANSISTOR	1	(Q,R)<R>
Q4811		2SD636	TRANSISTOR	1	(Q,R)<R>
			RESISTORS		
R4801		ERDS2TJ474	CARBON 1/4W 470K	1	
R4802		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R4803		ERDS2TJ221	CARBON 1/4W 220	1	
R4804		ERDS2TJ471	CARBON 1/4W 470	1	
R4805		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R4806		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R4807		ERDS2TJ183	CARBON 1/4W 18K	1	
R4808		ERDS2TJ102	CARBON 1/4W 1K	1	
R4809		ERDS2TJ151	CARBON 1/4W 150	1	
R4810		ERDS2TJ102	CARBON 1/4W 1K	1	
R4811		ERDS2TJ102	CARBON 1/4W 1K	1	
R4812		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R4813		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R4814		ERDS2TJ102	CARBON 1/4W 1K	1	
R4815		ERDS2TJ220	CARBON 1/4W 22	1	
R4816		ERDS2TJ220	CARBON 1/4W 22	1	
R4817		ERDS2TJ100	CARBON 1/4W 10	1	
R4818		ERDS2TJ100	CARBON 1/4W 10	1	
R4819		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R4820		ERDS2TJ102	CARBON 1/4W 1K	1	
R4821		ERDS2TJ102	CARBON 1/4W 1K	1	
R4822		ERDS2TJ223	CARBON 1/4W 22K	1	
R4823		ERDS2TJ561	CARBON 1/4W 560	1	
R4824		ERDS2TJ561	CARBON 1/4W 560	1	
R4825		ERDS2TJ153	CARBON 1/4W 15K	1	
R4826		ERDS2TJ393	CARBON 1/4W 39K	1	
R4827		ERDS2TJ393	CARBON 1/4W 39K	1	
R4828		ERDS2TJ153	CARBON 1/4W 15K	1	
R4829		ERDS2TJ273	CARBON 1/4W 27K	1	
R4830		ERDS2TJ473	CARBON 1/4W 47K	1	
R4831		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R4832		ERDS2TJ102	CARBON 1/4W 1K	1	
R4833		ERDS2TJ473	CARBON 1/4W 47K	1	
R4834		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R4835		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R4836		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R4837		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R4838		ERDS2TJ100	CARBON 1/4W 10	1	
R4839		ERDS2TJ223	CARBON 1/4W 22K	1	
R4840		ERDS2TJ223	CARBON 1/4W 22K	1	
R4841		ERDS2TJ102	CARBON 1/4W 1K	1	
R4842		ERDS2TJ223	CARBON 1/4W 22K	1	
R4843		ERDS2TJ223	CARBON 1/4W 22K	1	
R4844		ERDS2TJ103	CARBON 1/4W 10K	1	
R4845		ERDS2TJ103	CARBON 1/4W 10K	1	
VR4801		EVN32CA00B54	VARIABLE 50K	1	
			MISCELLANEOUS		
		VMP0972	SUPPORT	1	
		VSC1698	SHIELD CASE (MIDDLE)	1	
		VSC1699	SHIELD CASE (LOWER)	1	
	■	VEP05079B	VIDEO HEAD AMP C.B.A.		

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
			CAPACITORS		
C5001		ECCF1H330KC	CERAMIC 50V 33P	1	
C5002		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5003		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5004		ECCF1H120KC	CERAMIC 50V 12P	1	
C5005		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C5006		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5007		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C5008		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5009		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5010		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C5011		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C5012		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C5013		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5014		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C5015		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5016		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C5017		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C5018		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5021		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5022		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C5023		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C5024		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5027		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5028		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C5029		ECCF1H101KC	CERAMIC 50V 100P	1	
C5030		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C5031		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5032		ECCF1H150KC	CERAMIC 50V 15P	1	
C5033		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5035		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5036		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5037		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5038		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5039		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C5040		ECQB1H223KH	MYLAR 50V 0.022U	1	
C5041		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5042		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5043		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5044		ECQB1H153JH	MYLAR 50V 0.015U	1	
C5045		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C5046		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C5047		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5048		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C5049		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5050		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C5051		ECKF1H101KB	CERAMIC 50V 100P	1	
C5052		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C5053		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5054		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5055		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5056		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C5057		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C5058		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C5059		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5060		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C5061		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5062		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5063		ECCF1H680KC	CERAMIC 50V 68P	1	
C5064		ECCF1H220KC	CERAMIC 50V 22P	1	
C5065		ECCF1H220KC	CERAMIC 50V 22P	1	
C5066		ECCF1H121JC	CERAMIC 50V 120P	1	
C5067		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C5068		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C5069		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
D5001		MA165	DIODE	1	<R>
D5002		MA165	DIODE	1	<R>
D5003		MA165	DIODE	1	<R>
D5004		MA165	DIODE	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
D5009		MA165	DIODE	1	<R>
D5010		MA165	DIODE	1	<R>
FL5001		VLF0085	FILTER	1	
IC5001		AN3311K	IC	1	<R>
L5001		VLQEL05F221K	COIL 220UH	1	
L5002		VLQEL05F390K	COIL 39UH	1	
L5003		VLQEL05F221K	COIL 220UH	1	
L5004		VLQEL05F221K	COIL 220UH	1	
L5005		VLQEL05F221K	COIL 220UH	1	
L5006		VLQEL05F331K	COIL 330UH	1	
L5010		VLQEL05F101K	COIL 100UH	1	
L5011		VLQEL05F221K	COIL 220UH	1	
L5012		VLQEL05F390K	COIL 39UH	1	
L5014		VLQEL05F121K	COIL 120UH	1	
P5001		VJP1238T	CONNECTOR(MALE) 11P	1	
P5002		VJP1147	CONNECTOR(MALE)	1	
P5003		VJP1230T	CONNECTOR(MALE) 3P	1	
P5004		VJP1231T	CONNECTOR(MALE) 4P	1	
Q5001		2SC2206	TRANSISTOR	1	(B,C)<R>
Q5002		2SC2206	TRANSISTOR	1	(B,C)<R>
Q5003		2SC2206	TRANSISTOR	1	(B,C)<R>
Q5004		2SD638	TRANSISTOR	1	(Q,R)<R>
Q5005		2SB643	TRANSISTOR	1	(Q,R)<R>
Q5006		2SB643	TRANSISTOR	1	(Q,R)<R>
Q5007		2SD636	TRANSISTOR	1	(Q,R)<R>
Q5008		2SD638	TRANSISTOR	1	(Q,R)<R>
Q5009		2SD638	TRANSISTOR	1	(Q,R)<R>
Q5010		2SD638	TRANSISTOR	1	(Q,R)<R>
Q5011		2SD636	TRANSISTOR	1	(Q,R)<R>
Q5012		2SC2206	TRANSISTOR	1	(B,C)<R>
Q5013		2SD638	TRANSISTOR	1	(Q,R)<R>
Q5014		2SD636	TRANSISTOR	1	(Q,R)<R>
Q5015		2SC2206	TRANSISTOR	1	(B,C)<R>
Q5016		2SD636	TRANSISTOR	1	(Q,R)<R>
Q5017		2SD636	TRANSISTOR	1	(Q,R)<R>
Q5018		2SC2206	TRANSISTOR	1	(B,C)<R>
Q5019		2SB643	TRANSISTOR	1	(Q,R)<R>
Q5020		2SD638	TRANSISTOR	1	(Q,R)<R>
Q5021		2SB643	TRANSISTOR	1	(Q,R)<R>
Q5022		2SD636	TRANSISTOR	1	(Q,R)<R>
Q5023		2SC2206	TRANSISTOR	1	(B,C)<R>
Q5024		2SD636	TRANSISTOR	1	(Q,R)<R>
Q5025		2SB641	TRANSISTOR	1	(Q,R)<R>
Q5026		2SD636	TRANSISTOR	1	(Q,R)<R>
Q5027		2SC2206	TRANSISTOR	1	(B,C)<R>
Q5028		2SD636	TRANSISTOR	1	(Q,R)<R>
QR5001		UN1212	TRANSISTOR-RESISTOR	1	<R>
			RESISTORS		
R5001		ERDS2TJ102	CARBON 1/4W 1K	1	
R5002		ERDS2TJ102	CARBON 1/4W 1K	1	
R5003		ERDS2TJ102	CARBON 1/4W 1K	1	
R5004		ERDS2TJ561	CARBON 1/4W 560	1	
R5005		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R5006		ERDS2TJ102	CARBON 1/4W 1K	1	
R5007		ERDS2TJ101	CARBON 1/4W 100	1	
R5008		ERDS2TJ103	CARBON 1/4W 10K	1	
R5009		ERDS2TJ153	CARBON 1/4W 15K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R5010		ERDS2TJ183	CARBON 1/4W 18K	1	
R5011		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R5012		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R5013		ERDS2TJ561	CARBON 1/4W 560	1	
R5014		ERDS2TJ4R7	CARBON 1/4W 4.7	1	
R5015		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R5016		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R5017		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R5018		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R5019		ERDS2TJ390	CARBON 1/4W 39	1	
R5020		ERDS2TJ223	CARBON 1/4W 22K	1	
R5021		ERDS2TJ390	CARBON 1/4W 39	1	
R5022		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R5023		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R5024		ERDS2TJ100	CARBON 1/4W 10	1	
R5025		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R5026		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R5027		ERDS2TJ561	CARBON 1/4W 560	1	
R5028		ERDS2TJ100	CARBON 1/4W 10	1	
R5029		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R5030		ERDS2TJ1R0	CARBON 1/4W 1.0	1	
R5031		ERDS2TJ100	CARBON 1/4W 10	1	
R5032		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R5033		ERDS2TJ100	CARBON 1/4W 10	1	
R5034		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R5035		ERDS2TJ100	CARBON 1/4W 10	1	
R5036		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R5037		ERDS2TJ103	CARBON 1/4W 10K	1	
R5038		ERDS2TJ223	CARBON 1/4W 22K	1	
R5039		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R5040		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R5041		ERDS2TJ331	CARBON 1/4W 330	1	
R5043		ERDS2TJ102	CARBON 1/4W 1K	1	
R5044		ERDS2TJ330	CARBON 1/4W 33	1	
R5045		ERDS2TJ153	CARBON 1/4W 15K	1	
R5047		ERDS2TJ330	CARBON 1/4W 33	1	
R5048		ERDS2TJ102	CARBON 1/4W 1K	1	
R5049		ERDS2TJ223	CARBON 1/4W 22K	1	
R5050		ERDS2TJ223	CARBON 1/4W 22K	1	
R5051		ERDS2TJ102	CARBON 1/4W 1K	1	
R5052		ERDS2TJ560	CARBON 1/4W 56	1	
R5053		ERDS2TJ561	CARBON 1/4W 560	1	
R5054		ERDS2TJ102	CARBON 1/4W 1K	1	
R5055		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R5056		ERDS2TJ153	CARBON 1/4W 15K	1	
R5057		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R5059		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R5060		ERDS2TJ101	CARBON 1/4W 100	1	
R5061		ERDS2TJ101	CARBON 1/4W 100	1	
R5062		ERDS2TJ821	CARBON 1/4W 820	1	
R5063		ERDS2TJ821	CARBON 1/4W 820	1	
R5064		ERDS2TJ103	CARBON 1/4W 10K	1	
R5065		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R5066		ERDS2TJ223	CARBON 1/4W 22K	1	
R5067		ERDS2TJ333	CARBON 1/4W 33K	1	
R5068		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R5069		ERDS2TJ4R7	CARBON 1/4W 4.7	1	
R5070		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R5071		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R5072		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R5073		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R5074		ERDS2TJ390	CARBON 1/4W 39	1	
R5075		ERDS2TJ390	CARBON 1/4W 39	1	
R5076		ERDS2TJ223	CARBON 1/4W 22K	1	
R5077		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R5078		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R5079		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R5080		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R5081		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R5082		ERDS2TJ561	CARBON 1/4W 560	1	
R5083		ERDS2TJ103	CARBON 1/4W 10K	1	
R5084		ERDS2TJ103	CARBON 1/4W 10K	1	
R5085		ERDS2TJ471	CARBON 1/4W 470	1	
R5086		ERDS2TJ102	CARBON 1/4W 1K	1	
R5087		ERDS2TJ103	CARBON 1/4W 10K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R5088		ERDS2TJ102	CARBON 1/4W 1K	1	
R5089		ERDS2TJ103	CARBON 1/4W 10K	1	
R5091		ERDS2TJ102	CARBON 1/4W 1K	1	
R5092		ERDS2TJ102	CARBON 1/4W 1K	1	
R5093		ERDS2TJ100	CARBON 1/4W 10	1	
R5094		ERDS2TJ822	CARBON 1/4W 8.2K	1	
R5095		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R5096		ERDS2TJ223	CARBON 1/4W 22K	1	
R5097		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R5098		ERDS2TJ223	CARBON 1/4W 22K	1	
R5099		ERDS2TJ271	CARBON 1/4W 270	1	
VR5001		EVM38GA00B23	VARIABLE 2K	1	
VR5002		EVM38GA00B23	VARIABLE 2K	1	
VR5003		EVM38GA00B23	VARIABLE 2K	1	
VR5004		EVM38GA00B23	VARIABLE 2K	1	
VR5005		EVM38GA00B22	VARIABLE 200	1	
			MISCELLANEOUS		
		VSC1701	SHIELD CASE (MIDDLE)	1	
		VSC1703	SHIELD CASE (LOWER)	1	
	■	VEP06319B1	SYSTEM CONTROL C.B.A.		
			CAPACITORS		
C6001		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6002		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6003		ECKF1H472ZF	CERAMIC 50V 4700P	1	
C6004		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C6005		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6006		ECEA1EK470	ELECTROLYTIC 25V 47U	1	
C6007		ECEA1HN2R2S	ELECTROLYTIC 50V 2.2U	1	
C6008		ECEA1HN2R2S	ELECTROLYTIC 50V 2.2U	1	
C6009		ECEA1HK3R3	ELECTROLYTIC 50V 3.3U	1	
C6010		ECEA1HK3R3	ELECTROLYTIC 50V 3.3U	1	
C6011		ECEA1HK3R3	ELECTROLYTIC 50V 3.3U	1	
C6013		ECEA1EU221	ELECTROLYTIC 25V 220U	1	
C6014		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C6015		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C6016		ECCF1H680JC	CERAMIC 50V 68P	1	
C6017		ECCF1H680JC	CERAMIC 50V 68P	1	
C6018		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C6019		ECCF1H101JC	CERAMIC 50V 100P	1	
C6020		ECQP1H683GZ	MYLAR 50V 0.068U	1	
C6021		ECQM1H102JV	MYLAR 50V 1000P	1	
C6022		ECQM1H102JV	MYLAR 50V 1000P	1	
C6023		ECQM1H122JV	MYLAR 50V 1200P	1	
C6024		ECQM1H102JV	MYLAR 50V 1000P	1	
C6025		ECQP1H104GZ	MYLAR 50V 0.1U	1	
C6026		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6027		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6028		ECQM1H123JV	MYLAR 50V 0.012U	1	
C6029		ECKF1H681KB	CERAMIC 50V 680P	1	
C6030		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6031		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6032		ECQM1H123JV	MYLAR 50V 0.012U	1	
C6033		ECKF1H681KB	CERAMIC 50V 680P	1	
C6034		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C6035		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6036		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6037		ECQM1H102JV	MYLAR 50V 1000P	1	
C6038		ECCF1H470KC	CERAMIC 50V 47P	1	
C6039		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C6040		ECKF1H103ZF	CERAMIC 50V 0.01U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C6041		ECCF1H101JC	CERAMIC 50V 100P	1	
C6042		ECQM1H122JV	MYLAR 50V 1200P	1	
C6043		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6044		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6047		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6052		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6053		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6056		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6057		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C6058		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6059		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6060		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6061		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6062		ECCF1H180KC	CERAMIC 50V 18P	1	
C6063		ECCF1H180KC	CERAMIC 50V 18P	1	
C6064		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6065		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6066		ECKF1H102KB	CERAMIC 50V 1000P	1	
C6067		ECKF1H102KB	CERAMIC 50V 1000P	1	
C6068		ECKF1H102KB	CERAMIC 50V 1000P	1	
C6069		ECKF1H102KB	CERAMIC 50V 1000P	1	
C6070		ECQV1H224JZ	MYLAR 50V 0.22U	1	
C6071		ECQV1H224JZ	MYLAR 50V 0.22U	1	
C6072		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C6073		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C6077		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C6078		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C6079		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C6080		ECCF1H331J	CERAMIC 50V 330P	1	
C6081		ECCF1H331J	CERAMIC 50V 330P	1	
D6001		MA165	DIODE	1	<R>
D6002		MA165	DIODE	1	<R>
D6003		RD10FB	ZENER 10V	1	<R>
D6004		MA165	DIODE	1	<R>
D6005		MA165	DIODE	1	<R>
D6006		MA165	DIODE	1	<R>
D6007		MA165	DIODE	1	<R>
D6008		MA165	DIODE	1	<R>
D6009		MA165	DIODE	1	<R>
D6010		MA165	DIODE	1	<R>
D6011		MA165	DIODE	1	<R>
D6012		MA165	DIODE	1	<R>
D6013		MA165	DIODE	1	<R>
D6014		MA165	DIODE	1	<R>
D6015		MA165	DIODE	1	<R>
D6016		MA165	DIODE	1	<R>
D6017		MA165	DIODE	1	<R>
D6018		MA165	DIODE	1	<R>
D6021		MA165	DIODE	1	<R>
D6022		MA165	DIODE	1	<R>
D6023		MA165	DIODE	1	<R>
D6024		MA165	DIODE	1	<R>
D6025		MA165	DIODE	1	<R>
D6026		MA165	DIODE	1	<R>
D6027		MA165	DIODE	1	<R>
D6028		MA165	DIODE	1	<R>
D6029		MA165	DIODE	1	<R>
D6030		MA165	DIODE	1	<R>
D6031		MA165	DIODE	1	<R>
D6032		MA165	DIODE	1	<R>
D6033		MA165	DIODE	1	<R>
D6034		MA165	DIODE	1	<R>
D6035		MA165	DIODE	1	<R>
D6036		MA165	DIODE	1	<R>
D6037		MA165	DIODE	1	<R>
D6038		MA165	DIODE	1	<R>
D6039		MA165	DIODE	1	<R>
D6040		MA165	DIODE	1	<R>
D6041		MA165	DIODE	1	<R>
D6042		MA165	DIODE	1	<R>
D6043		MA165	DIODE	1	<R>
DA6001		DAN401	DIODE ARAY	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
IC6001		UPD1512AC135	IC	1	<R>
IC6002		UPC339C	IC	1	<R>
IC6003		PU3124	IC	1	<R>
IC6004		PU3124	IC	1	<R>
IC6005		BA6238A	IC	1	<!><R>
IC6006		UPD4030BC	IC	1	<R>
IC6007		UPD4030BC	IC	1	<R>
IC6008		AN90B20	IC	1	<R>
IC6009		BA236B	IC	1	<R>
IC6010		UPD4069UBC	IC	1	<R>
IC6011		BA236B	IC	1	<R>
IC6012		UPC339C	IC	1	<R>
IC6013		UPD4013BC	IC	1	<R>
IC6014		BA236B	IC	1	<R>
IC6015		UPD4013BC	IC	1	<R>
IC6016		UPD4011BC	IC	1	<R>
IC6017		AN90B22	IC	1	<R>
IC6020		UPC393C	IC	1	<R>
IC6021		UPD4013BC	IC	1	<R>
L6001		VLQEL05F5R6K	COIL 5.6UH	1	
L6002		VLQEL05F221K	COIL 220UH	1	
L6003		VLQEL05F471K	COIL 470UH	1	
L6004		VLQEL05F220K	COIL 22UH	1	
P6001		VJP1236T	CONNECTOR(MALE) 9P	1	
P6002		VJP1237T	CONNECTOR(MALE) 10P	1	
P6003		VJP1230G	CONNECTOR(MALE) 3P	1	
P6004		VJP1231T	CONNECTOR(MALE) 4P	1	
P6005		VJP1232T	CONNECTOR(MALE) 5P	1	
P6006		VJP1231B	CONNECTOR(MALE) 4P	1	
P6007		VJP1234T	CONNECTOR(MALE) 7P	1	
P6008		VJP1230	CONNECTOR(MALE) 3P	1	
P6009		VJP1231T	CONNECTOR(MALE) 4P	1	
P6010		VJP1232R	CONNECTOR(MALE) 5P	1	
P6011		VJP1229	CONNECTOR(MALE) 2P	1	
P6012		VJP1230T	CONNECTOR(MALE) 3P	1	
P6013		VJP1231R	CONNECTOR(MALE) 4P	1	
P6014		VJP1229T	CONNECTOR(MALE) 2P	1	
Q6001		2SC3811	TRANSISTOR	1	(Q,R)<R>
Q6002		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6003		2SB644	TRANSISTOR	1	(Q,R)<R>
Q6004		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6005		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6006		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6007		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6008		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6009		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6010		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6011		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6012		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6013		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6014		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6015		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6016		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6017		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6018		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6019		2SC1047	TRANSISTOR	1	(C,D)<R>
Q6020		2SD639	TRANSISTOR	1	(Q,R)<!><R>
Q6021		2SD973	TRANSISTOR	1	(Q,R)<!><R>
Q6022		2SB793	TRANSISTOR	1	(Q,R)<R>
Q6023		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6024		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6025		2SC1047	TRANSISTOR	1	(C,D)<R>
Q6026		2SD639	TRANSISTOR	1	(Q,R)<!><R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
Q6027		2SD973	TRANSISTOR	1	(Q,R)<!><R>
Q6028		2SB793	TRANSISTOR	1	(Q,R)<R>
Q6030		2SC2206	TRANSISTOR	1	(B,C)<R>
Q6031		2SC2206	TRANSISTOR	1	(B,C)<R>
Q6033		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6034		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6035		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6036		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6037		2SD1330	TRANSISTOR	1	(S,T)<R>
Q6038		2SD1330	TRANSISTOR	1	(S,T)<R>
QR6009		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR6010		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR6011		UN1212	TRANSISTOR-RESISTOR	1	<R>
QR6012		UN1111	TRANSISTOR-RESISTOR	1	<R>
QR6013		UN1111	TRANSISTOR-RESISTOR	1	<R>
QR6014		UN1214	TRANSISTOR-RESISTOR	1	<R>
QR6015		UN1214	TRANSISTOR-RESISTOR	1	<R>
QR6016		UN1214	TRANSISTOR-RESISTOR	1	<R>
			RESISTORS		
R6001		ERDS2TJ473	CARBON 1/4W 47K	1	
R6002		ERDS2TJ473	CARBON 1/4W 47K	1	
R6003		ERDS2TJ153	CARBON 1/4W 15K	1	
R6004		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6005		ERDS2TJ103	CARBON 1/4W 10K	1	
R6006		ERDS2TJ103	CARBON 1/4W 10K	1	
R6007		ERDS2TJ333	CARBON 1/4W 33K	1	
R6008		ERDS2TJ105	CARBON 1/4W 1000K	1	
R6009		ERDS2TJ224	CARBON 1/4W 220K	1	
R6010		ERDS2TJ184	CARBON 1/4W 180K	1	
R6011		ERDS2TJ103	CARBON 1/4W 10K	1	
R6012		ERDS2TJ105	CARBON 1/4W 1000K	1	
R6013		ERDS2TJ103	CARBON 1/4W 10K	1	
R6014		ERDS2TJ103	CARBON 1/4W 10K	1	
R6015		ERDS2TJ680	CARBON 1/4W 68	1	
R6016		ERD50TJ181	CARBON 1/2W 180	1	
R6017		ERD50TJ181	CARBON 1/2W 180	1	
R6018		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R6019		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R6020		ERDS2TJ103	CARBON 1/4W 10K	1	
R6021		ERDS2TJ103	CARBON 1/4W 10K	1	
R6022		ERD62TJ103	CARBON 1/4W 10K	1	
R6023		ERDS2TJ103	CARBON 1/4W 10K	1	
R6024		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6025		ERDS2TJ473	CARBON 1/4W 47K	1	
R6026		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6027		ERDS2TJ563	CARBON 1/4W 56K	1	
R6028		ERDS2TJ103	CARBON 1/4W 10K	1	
R6029		ERDS2TJ471	CARBON 1/4W 470	1	
R6030		ERDS2TJ563	CARBON 1/4W 56K	1	
R6031		ERDS2TJ103	CARBON 1/4W 10K	1	
R6032		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6033		ERDS2TJ473	CARBON 1/4W 47K	1	
R6034		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6035		ERDS2TJ563	CARBON 1/4W 56K	1	
R6036		ERDS2TJ103	CARBON 1/4W 10K	1	
R6037		ERDS2TJ471	CARBON 1/4W 470	1	
R6038		ERDS2TJ563	CARBON 1/4W 56K	1	
R6039		ERDS2TJ103	CARBON 1/4W 10K	1	
R6040		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6041		ERDS2TJ473	CARBON 1/4W 47K	1	
R6042		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6043		ERDS2TJ563	CARBON 1/4W 56K	1	
R6044		ERDS2TJ103	CARBON 1/4W 10K	1	
R6045		ERDS2TJ471	CARBON 1/4W 470	1	
R6046		ERDS2TJ563	CARBON 1/4W 56K	1	
R6047		ERG1ANJ101	METAL OXIDE 1W 100	1	
R6048		ERG1ANJ101	METAL OXIDE 1W 100	1	
R6049		ERDS2TJ102	CARBON 1/4W 1K	1	
R6050		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R6051		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6052		ERDS2TJ103	CARBON 1/4W 10K	1	
R6053		ERDS2TJ103	CARBON 1/4W 10K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R6054		ERDS2TJ103	CARBON 1/4W 10K	1	
R6055		ERDS2TJ103	CARBON 1/4W 10K	1	
R6056		ERDS2TJ103	CARBON 1/4W 10K	1	
R6057		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6058		ERDS2TJ104	CARBON 1/4W 100K	1	
R6059		EROS2CKF1803	METAL OXIDE 1/4W 180K	1	
R6060		ERDS2TJ224	CARBON 1/4W 220K	1	
R6061		ERDS2TJ103	CARBON 1/4W 10K	1	
R6062		ERDS2TJ103	CARBON 1/4W 10K	1	
R6063		EROS2CKF2403	METAL OXIDE 1/4W 240K	1	
R6064		EROS2CKG5602	METAL OXIDE 1/4W 56K	1	
R6065		ERDS2TJ684	CARBON 1/4W 680K	1	
R6066		ERDS2TJ103	CARBON 1/4W 10K	1	
R6067		ERDS2TJ473	CARBON 1/4W 47K	1	
R6068		EROS2CKG8202	METAL OXIDE 1/4W 82K	1	
R6069		ERDS2TJ223	CARBON 1/4W 22K	1	
R6070		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R6071		ERDS2TJ223	CARBON 1/4W 22K	1	
R6072		ERDS2TJ223	CARBON 1/4W 22K	1	
R6073		ERDS2TJ391	CARBON 1/4W 390	1	
R6074		ERDS2TJ102	CARBON 1/4W 1K	1	
R6075		ERDS2TJ151	CARBON 1/4W 150	1	
R6076		ERDS2TJ5R6	CARBON 1/4W 5.6	1	
R6077		ERDS2TJ391	CARBON 1/4W 390	1	
R6078		ERDS2TJ391	CARBON 1/4W 390	1	
R6079		ERDS2TJ100	CARBON 1/4W 10	1	
R6080		ERDS2TJ100	CARBON 1/4W 10	1	
R6081		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R6082		ERDS2TJ223	CARBON 1/4W 22K	1	
R6083		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R6084		ERDS2TJ223	CARBON 1/4W 22K	1	
R6085		ERDS2TJ223	CARBON 1/4W 22K	1	
R6086		ERDS2TJ391	CARBON 1/4W 390	1	
R6087		ERDS2TJ102	CARBON 1/4W 1K	1	
R6088		ERDS2TJ151	CARBON 1/4W 150	1	
R6089		ERDS2TJ5R6	CARBON 1/4W 5.6	1	
R6090		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R6091		ERDS2TJ100	CARBON 1/4W 10	1	
R6092		ERDS2TJ100	CARBON 1/4W 10	1	
R6093		ERDS2TJ153	CARBON 1/4W 15K	1	
R6094		ERDS2TJ153	CARBON 1/4W 15K	1	
R6095		ERDS2TJ153	CARBON 1/4W 15K	1	
R6096		ERDS2TJ822	CARBON 1/4W 8.2K	1	
R6097		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R6098		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R6099		ERDS2TJ123	CARBON 1/4W 12K	1	
R6100		ERDS2TJ153	CARBON 1/4W 15K	1	
R6101		ERDS2TJ102	CARBON 1/4W 1K	1	
R6102		ERDS2TJ274	CARBON 1/4W 270K	1	
R6103		ERDS2TJ103	CARBON 1/4W 10K	1	
R6104		ERDS2TJ153	CARBON 1/4W 15K	1	
R6105		ERDS2TJ153	CARBON 1/4W 15K	1	
R6106		ERDS2TJ153	CARBON 1/4W 15K	1	
R6107		ERDS2TJ105	CARBON 1/4W 1000K	1	
R6108		ERDS2TJ103	CARBON 1/4W 10K	1	
R6109		ERDS2TJ223	CARBON 1/4W 22K	1	
R6110		ERDS2TJ223	CARBON 1/4W 22K	1	
R6111		ERDS2TJ334	CARBON 1/4W 330K	1	
R6112		ERDS2TJ103	CARBON 1/4W 10K	1	
R6113		ERDS2TJ153	CARBON 1/4W 15K	1	
R6114		ERDS2TJ153	CARBON 1/4W 15K	1	
R6115		ERDS2TJ153	CARBON 1/4W 15K	1	
R6116		ERDS2TJ105	CARBON 1/4W 1000K	1	
R6117		ERDS2TJ103	CARBON 1/4W 10K	1	
R6118		ERDS2TJ333	CARBON 1/4W 33K	1	
R6119		ERDS2TJ104	CARBON 1/4W 100K	1	
R6120		ERDS2TJ273	CARBON 1/4W 27K	1	
R6121		ERDS2TJ273	CARBON 1/4W 27K	1	
R6122		ERDS2TJ105	CARBON 1/4W 1000K	1	
R6123		ERDS2TJ103	CARBON 1/4W 10K	1	
R6124		ERDS2TJ153	CARBON 1/4W 15K	1	
R6125		ERDS2TJ105	CARBON 1/4W 1000K	1	
R6126		ERDS2TJ103	CARBON 1/4W 10K	1	
R6127		ERDS2TJ684	CARBON 1/4W 680K	1	
R6128		ERDS2TJ105	CARBON 1/4W 1000K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R6129		ERDS2TJ105	CARBON 1/4W 1000K	1	
R6130		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6133		ERDS2TJ105	CARBON 1/4W 1000K	1	
R6134		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6137		ERDS2TJ105	CARBON 1/4W 1000K	1	
R6138		ERDS2TJ102	CARBON 1/4W 1K	1	
R6139		ERDS2TJ102	CARBON 1/4W 1K	1	
R6149		ERDS2TJ101	CARBON 1/4W 100	1	
R6150		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R6151		ERDS2TJ103	CARBON 1/4W 10K	1	
R6152		ERDS2TJ103	CARBON 1/4W 10K	1	
R6153		ERDS2TJ103	CARBON 1/4W 10K	1	
R6154		ERDS2TJ563	CARBON 1/4W 56K	1	
R6155		ERDS2TJ103	CARBON 1/4W 10K	1	
R6156		ERDS2TJ563	CARBON 1/4W 56K	1	
R6157		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R6158		ERDS2TJ102	CARBON 1/4W 1K	1	
RA6001		EXBP85472J	RESISTOR & RESISTOR 4.7K	1	
RA6002		EXBP84103J	RESISTOR & RESISTOR 10K	1	
RA6003		EXBP84103J	RESISTOR & RESISTOR 10K	1	
RA6004		EXBP84473J	RESISTOR & RESISTOR 47K	1	
VR6001		EVN32CA00B23	VARIABLE 3K	1	
VR6002		EVN32CA00B23	VARIABLE 3K	1	
VR6003		EVM31GA00B15	VARIABLE 100K	1	
VR6004		EVM31GA00B15	VARIABLE 100K	1	
X6001		VSX0128	CRYSTAL OSCILLATOR	1	
			MISCELLANEOUS		
		VMP0903	SUPPORT	1	
	■	VEP06391A	INTERFACE C.B.A.		
			CAPACITORS		
C5217		ECKF1H471KB	CERAMIC 50V 470P	1	
C6201		ECCF1H330JC	CERAMIC 50V 33P	1	
C6202		ECCF1H330JC	CERAMIC 50V 33P	1	
C6204		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C6205		ECKF1H102ZF	CERAMIC 50V 1000P	1	
C6206		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C6207		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C6213		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C6214		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C6215		ECEA1EK4R7	ELECTROLYTIC 25V 4.7U	1	
C6216		ECEA1VU470	ELECTROLYTIC 35V 47U	1	
CA6201		EXFP81022W	C & C	1	
CA6202		EXFP81022W	C & C	1	
CA6203		EXFP81022W	C & C	1	
CA6204		EXFP81022W	C & C	1	
CA6205		EXFP81022W	C & C	1	
D6203		MA165	DIODE	1	<R>
IC6201		UPD7811G510	IC	1	<R>
IC6202		HD7406P	IC	1	<R>
IC6203		M51951BL	IC	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
L6201		VLQEL05F5R6K	COIL 5.6UH	1	
L6202		VLQ0067	COIL	1	
P6201		VJP1232R	CONNECTOR(MALE) 5P	1	
P6202		VJP1231T	CONNECTOR(MALE) 4P	1	
P6203		VJP1234T	CONNECTOR(MALE) 7P	1	
P6204		VJP1229	CONNECTOR(MALE) 2P	1	
P6205		VJP1230G	CONNECTOR(MALE) 3P	1	
P6206		VJS1822	CONNECTOR(FEMALE)	1	
P6207		VJP1232T	CONNECTOR(MALE) 5P	1	
P6208		VJP1229T	CONNECTOR(MALE) 2P	1	
P6209		VJP1229	CONNECTOR(MALE) 2P	1	
P6210		VJP1229T	CONNECTOR(MALE) 2P	1	
Q6203		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6205		2SD636	TRANSISTOR	1	(Q,R)<R>
QR6201		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR6202		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR6203		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR6204		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR6205		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR6206		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR6207		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR6208		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR6209		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR6210		UN1211	TRANSISTOR-RESISTOR	1	<R>
QR6211		UN1211	TRANSISTOR-RESISTOR	1	<R>
			RESISTORS		
R6201		ERDS2TJ103	CARBON 1/4W 10K	1	
R6202		ERDS2TJ103	CARBON 1/4W 10K	1	
R6203		ERDS2TJ103	CARBON 1/4W 10K	1	
R6204		ERDS2TJ103	CARBON 1/4W 10K	1	
R6205		ERDS2TJ103	CARBON 1/4W 10K	1	
R6206		ERDS2TJ103	CARBON 1/4W 10K	1	
R6207		ERDS2TJ103	CARBON 1/4W 10K	1	
R6208		ERDS2TJ103	CARBON 1/4W 10K	1	
R6209		ERDS2TJ103	CARBON 1/4W 10K	1	
R6210		ERDS2TJ103	CARBON 1/4W 10K	1	
R6211		ERDS2TJ103	CARBON 1/4W 10K	1	
R6212		ERDS2TJ103	CARBON 1/4W 10K	1	
R6213		ERDS2TJ103	CARBON 1/4W 10K	1	
R6214		ERDS2TJ103	CARBON 1/4W 10K	1	
R6215		ERDS2TJ103	CARBON 1/4W 10K	1	
R6216		ERDS2TJ103	CARBON 1/4W 10K	1	
R6217		ERDS2TJ103	CARBON 1/4W 10K	1	
R6218		ERDS2TJ103	CARBON 1/4W 10K	1	
R6219		ERDS2TJ103	CARBON 1/4W 10K	1	
R6220		ERDS2TJ103	CARBON 1/4W 10K	1	
R6221		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R6222		ERDS2TJ103	CARBON 1/4W 10K	1	
R6227		ERDS2TJ150	CARBON 1/4W 15	1	
R6228		ERDS2TJ103	CARBON 1/4W 10K	1	
R6229		ERDS2TJ153	CARBON 1/4W 15K	1	
R6230		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R6233		ERDS2TJ103	CARBON 1/4W 10K	1	
R6234		ERDS2TJ103	CARBON 1/4W 10K	1	
R6235		ERDS2TJ103	CARBON 1/4W 10K	1	
R6236		ERDS2TJ103	CARBON 1/4W 10K	1	
R6237		ERDS2TJ102	CARBON 1/4W 1K	1	
R6238		ERDS2TJ103	CARBON 1/4W 10K	1	
R6239		ERDS2TJ102	CARBON 1/4W 1K	1	
R6245		ERDS2TJ103	CARBON 1/4W 10K	1	
R6247		ERQ12AJ2R7P	FUSE 1/2W 2.7	1	<!>
R6268		ERDS2TJ105	CARBON 1/4W 1000K	1	
R6269		ERDS2TJ103	CARBON 1/4W 10K	1	
R6270		ERDS2TJ684	CARBON 1/4W 680K	1	
R6271		ERDS2TJ473	CARBON 1/4W 47K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R6272		ERDS2TJ103	CARBON 1/4W 10K	1	
R6273		ERDS2TJ103	CARBON 1/4W 10K	1	
RA6201		EXBP86103J	RESISTOR&RESISTOR 10K	1	
RA6202		EXBP88103J	RESISTOR & RESISTOR 10K	1	
RA6203		EXBP86103J	RESISTOR&RESISTOR 10K	1	
X6201		VSX0178	CRYSTAL OSCILLATOR	1	
			MISCELLANEOUS		
		TJC6319	FUSE HOLDER	2	<!>
		VSE0036	TIMER	1	
		VSC1847	HEAT SINK	1	
	■	VEPO6321A	REAR JACK (1) C.B.A.		
P6404		VJS1822	CONNECTOR(FEMALE)	1	
P6409		VJS1327	CONNECTOR(FEMALE) 34P	1	
			MISCELLANEOUS		
		VMX0674	34P SPACER	1	
	■	VEPO6322B	KEY BOARD C.B.A.		
			CAPACITORS		
C6901		ECEA0JU102	ELECTROLYTIC 6.3V 1000U	1	
C6903		ECCF1H680JC	CERAMIC 50V 68P	1	
C6904		ECCF1H680JC	CERAMIC 50V 68P	1	
C6905		ECEA0JU102	ELECTROLYTIC 6.3V 1000U	1	
C6906		ECEA0JU102	ELECTROLYTIC 6.3V 1000U	1	
C6907		ECQB1H472JH	MYLAR 50V 4700P	1	
C6908		ECEA1HK100	ELECTROLYTIC 50V 10U	1	
C6909		ECEA0JU102	ELECTROLYTIC 6.3V 1000U	1	
C6910		ECEA0JU102	ELECTROLYTIC 6.3V 1000U	1	
D6901		MA165	DIODE	1	<R>
D6902		MA165	DIODE	1	<R>
D6903		MA166	DIODE	1	<R>
D6904		MA4091M	DIODE	1	<R>
D6905		MA4330M	DIODE	1	<R>
D6906		MA165	DIODE	1	<R>
D6907		MA165	DIODE	1	<R>
D6908		MA165	DIODE	1	<R>
D6909		MA165	DIODE	1	<R>
D6910		MA165	DIODE	1	<R>
D6911		MA165	DIODE	1	<R>
D6912		MA165	DIODE	1	<R>
D6913		MA165	DIODE	1	<R>
D6914		MA165	DIODE	1	<R>
D6915		MA165	DIODE	1	<R>
D6916		MA165	DIODE	1	<R>
D6917		MA165	DIODE	1	<R>
D6918		MA165	DIODE	1	<R>
D6919		MA165	DIODE	1	<R>
D6920		MA165	DIODE	1	<R>
D6921		MA165	DIODE	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
D6922		MA165	DIODE	1	<R>
D6923		MA165	DIODE	1	<R>
D6924		MA165	DIODE	1	<R>
D6925		MA165	DIODE	1	<R>
D6926		MA165	DIODE	1	<R>
D6927		MA165	DIODE	1	<R>
D6928		MA165	DIODE	1	<R>
D6929		MA165	DIODE	1	<R>
D6930		MA165	DIODE	1	<R>
D6931		MA165	DIODE	1	<R>
D6932		MA165	DIODE	1	<R>
D6933		MA165	DIODE	1	<R>
D6934		MA165	DIODE	1	<R>
D6935		MA165	DIODE	1	<R>
D6936		LN440YCPUVT	LED	1	<R>
D6937		LN440YCPUVT	LED	1	<R>
D6938		LN31GCPHL	LED	1	<R>
D6939		LN31GCPHL	LED	1	<R>
D6940		LN31GCPHL	LED	1	<R>
D6941		LN31GCPHL	LED	1	<R>
FL6901		VSL0081	DISPLAY	1	
IC6901		UPC339C	IC	1	<R>
IC6902		UPD1511AC105	IC	1	<R>
IC6903		AN6873N	IC	1	<R>
IC6904		AN6873N	IC	1	<R>
L6901		VLQEL05F470K	COIL 47UH	1	
L6902		VLQ0197	COIL	1	
L6903		VLQ0068	COIL	1	
P6901		VJP1876T	CONNECTOR(MALE)	1	
P6902		VJP1873T	CONNECTOR(MALE)	1	
P6903		VJP1877T	CONNECTOR(MALE)	1	
P6904		VJP1876T	CONNECTOR(MALE)	1	
P6905		VJP1873T	CONNECTOR(MALE)	1	
P6906		VJP1877T	CONNECTOR(MALE)	1	
P6907		VJP1879T	CONNECTOR(MALE)	1	
P6908		VJP1875T	CONNECTOR(MALE)	1	
Q6901		2SC3811	TRANSISTOR	1	(Q,R)<R>
Q6902		2SB643	TRANSISTOR	1	(Q,R)<R>
Q6903		2SB643	TRANSISTOR	1	(Q,R)<R>
Q6905		2SB643	TRANSISTOR	1	(Q,R)<R>
Q6908		2SB643	TRANSISTOR	1	(Q,R)<R>
Q6909		2SB643	TRANSISTOR	1	(Q,R)<R>
Q6910		2SD973	TRANSISTOR	1	(S)<!><R>
Q6911		2SD638	TRANSISTOR	1	(R,S)<R>
Q6912		2SD638	TRANSISTOR	1	(R,S)<R>
Q6913		2SD638	TRANSISTOR	1	(R,S)<R>
Q6914		2SD638	TRANSISTOR	1	(R,S)<R>
Q6915		2SD638	TRANSISTOR	1	(R,S)<R>
Q6916		2SD638	TRANSISTOR	1	(R,S)<R>
Q6917		2SD638	TRANSISTOR	1	(R,S)<R>
Q6920		2SB643	TRANSISTOR	1	(Q,R)<R>
			RESISTORS		
R6901		ERDS2TJ103	CARBON 1/4W 10K	1	
R6902		ERDS2TJ103	CARBON 1/4W 10K	1	
R6903		ERDS2TJ103	CARBON 1/4W 10K	1	
R6904		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R6905		ERDS2TJ102	CARBON 1/4W 1K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R6906		ERDS2TJ224	CARBON 1/4W 220K	1	
R6907		ERDS2TJ103	CARBON 1/4W 10K	1	
R6908		ERDS2TJ224	CARBON 1/4W 220K	1	
R6909		ERDS2TJ103	CARBON 1/4W 10K	1	
R6910		ERDS2TJ563	CARBON 1/4W 56K	1	
R6911		ERDS2TJ103	CARBON 1/4W 10K	1	
R6912		ERDS2TJ563	CARBON 1/4W 56K	1	
R6913		ERDS2TJ103	CARBON 1/4W 10K	1	
R6914		ERDS2TJ103	CARBON 1/4W 10K	1	
R6915		ERDS2TJ821	CARBON 1/4W 820	1	
R6916		ERDS2TJ821	CARBON 1/4W 820	1	
R6917		ERDS2TJ103	CARBON 1/4W 10K	1	
R6918		ERDS2TJ821	CARBON 1/4W 820	1	
R6921		ERDS2TJ471	CARBON 1/4W 470	1	
R6922		ERDS2TJ471	CARBON 1/4W 470	1	
R6923		ERDS2TJ102	CARBON 1/4W 1K	1	
R6924		ERDS2TJ470	CARBON 1/4W 47	1	
R6925		ERDS2TJ390	CARBON 1/4W 39	1	
R6926		ERDS2TJ390	CARBON 1/4W 39	1	
R6927		ERDS2TJ390	CARBON 1/4W 39	1	
R6928		ERDS2TJ390	CARBON 1/4W 39	1	
R6929		ERDS2TJ390	CARBON 1/4W 39	1	
R6930		ERDS2TJ103	CARBON 1/4W 10K	1	
R6931		ERDS2TJ180	CARBON 1/4W 18	1	
R6932		ERDS2TJ220	CARBON 1/4W 22	1	
R6933		ERDS2TJ220	CARBON 1/4W 22	1	
R6934		ERDS2TJ390	CARBON 1/4W 39	1	
R6936		ERDS2TJ103	CARBON 1/4W 10K	1	
R6937		ERDS2TJ103	CARBON 1/4W 10K	1	
R6938		ERDS2TJ103	CARBON 1/4W 10K	1	
R6939		ERDS2TJ103	CARBON 1/4W 10K	1	
R6940		ERDS2TJ390	CARBON 1/4W 39	1	
R6941		ERDS2TJ390	CARBON 1/4W 39	1	
R6942		ERDS2TJ390	CARBON 1/4W 39	1	
R6943		ERDS2TJ390	CARBON 1/4W 39	1	
R6946		ERDS2TJ223	CARBON 1/4W 22K	1	
R6947		ERDS2TJ333	CARBON 1/4W 33K	1	
R6948		ERDS2TJ333	CARBON 1/4W 33K	1	
R6949		ERDS2TJ102	CARBON 1/4W 1K	1	
R6950		ERDS2TJ102	CARBON 1/4W 1K	1	
R6951		ERDS2TJ102	CARBON 1/4W 1K	1	
R6952		ERDS2TJ102	CARBON 1/4W 1K	1	
R6953		ERDS2TJ102	CARBON 1/4W 1K	1	
R6955		ERDS2TJ102	CARBON 1/4W 1K	1	
R6956		ERDS2TJ821	CARBON 1/4W 820	1	
RA6901		EXBP84472J	RESISTOR&RESISTOR 4.7K	1	
RA6902		EXBP84333J	RESISTOR&RESISTOR 33K	1	
RA6903		EXBP88152J	RESISTOR & RESISTOR 1.5K	1	
SW6901		VSP0213	SWITCH	1	<R>
SW6902		VSP0198	SWITCH	1	<R>
SW6903		VSP0194	SWITCH	1	<R>
SW6904		VSP0204	SWITCH	1	<R>
SW6905		VSP0195	SWITCH	1	<R>
SW6906		VSP0196	SWITCH	1	<R>
SW6907		VSP0197	SWITCH	1	<R>
SW6908		VSP0193	SWITCH	1	<R>
SW6909		VSP0199	SWITCH	1	<R>
SW6910		VSP0199	SWITCH	1	<R>
SW6911		VSP0214	SWITCH	1	<R>
SW6912		VSP0215	SWITCH	1	<R>
SW6916		VSP0200	SWITCH	1	<R>
SW6917		VSP0200	SWITCH	1	<R>
SW6918		VSP0203	SWITCH	1	<R>
SW6919		VSP0202	SWITCH	1	<R>
SW6920		EVQQJ104K	SWITCH	1	<R>
SW6921		VSS0119	SWITCH	1	<R>
SW6922		ESD14185	SWITCH	1	<R>
SW6923		ESD14184	SWITCH	1	<R>
SW6924		ESD14184	SWITCH	1	<R>
SW6925		ESD14185	SWITCH	1	<R>
SW6926		ESD14184	SWITCH	1	<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
T6901		VLT0275	TRANSFORMER	1	
X6901		VSX0128	CRYSTAL OSCILLATOR	1	
			MISCELLANEOUS		
		VJF0344	DISPALY TUBE HOLDER (R)	1	
		VJF0345	DISPLAY TUBE HOLDER (L)	1	
		KL04	LED SPACER	1	
		VMX0861	LED SPACER	1	
		VMX0473	LED SPACER	1	
		VMX1031	COVER	1	
	■	VEP06324A	FRONT PANEL C.B.A.		
			CAPACITORS		
C6301		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C6302		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C6303		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C6304		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C6305		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
IC6301		UPD4066BC	IC	1	<R>
P6301		VJP1242G	CONNECTOR(MALE) 2P	1	
P6302		VJP1244R	CONNECTOR(MALE) 4P	1	
P6303		VJP1244G	CONNECTOR(MALE) 4P	1	
P6304		VJP1244T	CONNECTOR(MALE) 4P	1	
P6305		VJP1246T	CONNECTOR(MALE) 6P	1	
P6306		VJP1244B	CONNECTOR(MALE) 4P	1	
P6308		VJP1242R	CONNECTOR(MALE) 2P	1	
P6309		VJP1242T	CONNECTOR(MALE) 2P	1	
QR6301		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR6302		UN1213	TRANSISTOR-RESISTOR	1	<R>
			RESISTORS		
R6301		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R6302		ERDS2TJ104	CARBON 1/4W 100K	1	
R6303		ERDS2TJ103	CARBON 1/4W 10K	1	
R6304		ERDS2TJ104	CARBON 1/4W 100K	1	
R6305		ERDS2TJ103	CARBON 1/4W 10K	1	
R6306		ERDS2TJ103	CARBON 1/4W 10K	1	
R6307		ERDS2TJ102	CARBON 1/4W 1K	1	
R6308		ERDS2TJ122	CARBON 1/4W 1.2K	1	
VR6301		EVN38CA00B14	VARIABLE 10K	1	
VR6302		EVN38CA00B14	VARIABLE 10K	1	
VR6303		EVN38CA00B24	VARIABLE 20K	1	
VR6304		EVN38CA00B24	VARIABLE 20K	1	
VR6305		EVJL3AP20B14	VARIABLE 10K	1	
VR6306		EVJL3AP20B14	VARIABLE 10K	1	
VR6307		EVJL3AP20B14	VARIABLE 10K	1	
VR6308		EVJL3AP20B14	VARIABLE 10K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
VR6309		EVJKAAP20B52	VARIABLE 500	1	
VR6310		EVJL3AP20B15	VARIABLE 100K	1	
			MISCELLANEOUS		
		VMP0913	VR PANEL	1	
		VSC1800	SHIELD PLATE	1	
		VJF0108	RIVET	2	
	■	VEP08114A1	CHROMINANCE C.B.A.		
			CAPACITORS		
C8001		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8002		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8003		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8004		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8005		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C8006		ECQB1H223JZ	MYLAR 50V 0.022U	1	
C8007		ECQV1H334JZ	MYLAR 50V 0.33U	1	
C8008		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C8009		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8010		ECQM1H103JV	MYLAR 50V 0.01U	1	
C8011		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C8012		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C8013		ECKF1H102KB	CERAMIC 50V 1000P	1	
C8014		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8015		ECKF1H472KB	CERAMIC 50V 4700P	1	
C8016		ECCF1H470JC	CERAMIC 50V 47P	1	
C8017		ECKF1H102KB	CERAMIC 50V 1000P	1	
C8018		ECEA6Z220	ELECTROLYTIC 6V 22U	1	
C8019		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8020		ECCF1H080DC	CERAMIC 50V 8P	1	
C8021		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C8022		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C8023		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8024		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C8025		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C8026		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8027		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C8028		ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C8029		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C8030		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8031		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8032		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8033		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8034		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C8035		ECQB1H223JZ	MYLAR 50V 0.022U	1	
C8036		ECQV1H334JZ	MYLAR 50V 0.33U	1	
C8037		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C8038		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8039		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8040		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8041		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C8042		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C8043		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8044		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8045		ECEA6Z220	ELECTROLYTIC 6V 22U	1	
C8046		ECCF1H470JC	CERAMIC 50V 47P	1	
C8047		ECKF1H472KB	CERAMIC 50V 4700P	1	
C8048		ECKF1H102KB	CERAMIC 50V 1000P	1	
C8049		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C8050		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C8051		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8052		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C8053		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C8054		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8055		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C8056		ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C8057		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C8058		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C8059		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8060		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8061		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8062		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8063		ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C8064		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C8065		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8066		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8067		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8068		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C8069		ECCF1H100DC	CERAMIC 50V 10P	1	
C8070		ECV1ZW30X53T	TRIMMER 30P	1	
C8071		ECKF1H221KB	CERAMIC 50V 220P	1	
C8072		ECCF1H101JC	CERAMIC 50V 100P	1	
C8073		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8074		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C8075		ECCF1H390KC	CERAMIC 50V 39P	1	
C8076		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8077		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8078		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C8079		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C8080		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8081		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8082		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8083		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8084		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8085		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8086		ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C8087		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8088		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8089		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8090		ECKF1H332KB	CERAMIC 50V 3300P	1	
C8091		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C8092		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8093		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8094		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8095		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8096		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8097		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C8098		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8100		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8101		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8102		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C8103		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8104		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C8105		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8106		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8107		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C8108		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8109		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C8111		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8112		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C8113		ECEA1CN101S	ELECTROLYTIC 16V 100U	1	
C8114		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8115		ECEA1CU331	ELECTROLYTIC 16V 330U	1	
C8116		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8117		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8118		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8119		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C8120		ECCF1H470JC	CERAMIC 50V 47P	1	
C8121		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8122		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8123		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8124		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C8125		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8126		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8127		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C8128		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8129		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C8130		ECKF1H103ZF	CERAMIC 50V 0.01U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
D8001		MA165	DIODE	1	<R>
D8002		MA165	DIODE	1	<R>
D8003		MA165	DIODE	1	<R>
D8004		MA165	DIODE	1	<R>
D8005		MA165	DIODE	1	<R>
D8006		MA165	DIODE	1	OR 1SS119, 1SS254<R>
DL8001		VLD0032	DELAY LINE	1	<R>
DL8002		VLD0032	DELAY LINE	1	<R>
DL8003		VLD0031	DELAY LINE	1	<R>
DL8004		VLD0032	DELAY LINE	1	<R>
DL8005		VLD0032	DELAY LINE	1	<R>
DL8007		EFDHR124A13A	DELAY LINE	1	<R>
FL8001		VLF0113	FILTER	1	
FL8002		VLF0095	FILTER	1	
FL8003		VLF0094	FILTER	1	
FL8004		VLF0095	FILTER	1	
FL8005		VLF0303	FILTER	1	
FL8006		VLF0102	FILTER	1	
IC8001		AN6367K	IC	1	<R>
IC8002		MN6163A	IC	1	<R>
IC8003		AN6367K	IC	1	<R>
IC8004		MN6163A	IC	1	<R>
IC8005		BA7001	IC	1	<R>
IC8006		UPD4053BC	IC	1	<R>
IC8007		BA7001	IC	1	<R>
IC8008		AN608P	IC	1	<R>
IC8009		AN608P	IC	1	<R>
L8001		VLQEL05F101K	COIL 100UH	1	
L8002		VLQEL05F101K	COIL 100UH	1	
L8003		VLQEL05F221K	COIL 220UH	1	
L8004		VLQEL05F221K	COIL 220UH	1	
L8005		VLQEL05F330K	COIL 33UH	1	
L8006		VLQEL05F101K	COIL 100UH	1	
L8007		VLQEL05F181K	COIL 180UH	1	
L8008		VLQEL05F221K	COIL 220UH	1	
L8009		VLQEL05F221K	COIL 220UH	1	
L8010		VLQEL05F221K	COIL 220UH	1	
L8011		VLQEL05F271K	COIL 270UH	1	
L8012		VLQEL05F221K	COIL 220UH	1	
L8013		VLQEL05F221K	COIL 220UH	1	
L8014		VLQEL05F150K	COIL 15UH	1	
L8015		VLQEL05F470K	COIL 47UH	1	
P8001		VJP1234T	CONNECTOR(MALE) 7P	1	
P8002		VJP1235T	CONNECTOR(MALE) 8P	1	
P8003		VJP1231R	CONNECTOR(MALE) 4P	1	
P8004		VJP1230T	CONNECTOR(MALE) 3P	1	
P8005		VJP1230G	CONNECTOR(MALE) 3P	1	
P8006		VJP1231T	CONNECTOR(MALE) 4P	1	
P8007		VJP1230R	CONNECTOR(MALE) 3P	1	
P8008		VJP1230T	CONNECTOR(MALE) 3P	1	
P8009		VJP1232T	CONNECTOR(MALE) 5P	1	
Q8001		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8002		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8003		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8004		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8005		2SB641	TRANSISTOR	1	(Q,R)<R>
Q8006		2SK301	TRANSISTOR	1	(P)<R>
Q8007		2SC2206	TRANSISTOR	1	(B,C)<R>
Q8008		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8009		2SD636	TRANSISTOR	1	(Q,R)<R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
Q8010		2SB641	TRANSISTOR	1	(Q,R)<R>
Q8011		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8012		2SK301	TRANSISTOR	1	(P)<R>
Q8013		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8014		2SC2206	TRANSISTOR	1	(B,C)<R>
Q8015		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8016		2SB643	TRANSISTOR	1	(Q,R)<R>
Q8017		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8018		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8019		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8020		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8021		2SB641	TRANSISTOR	1	(Q,R)<R>
Q8022		2SK301	TRANSISTOR	1	(P)<R>
Q8023		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8024		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8025		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8026		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8027		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8028		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8029		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8030		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8031		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8032		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8033		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8034		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8035		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8036		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8037		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8038		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8039		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8040		2SD636	TRANSISTOR	1	(Q,R)<R>
Q8041		2SD636	TRANSISTOR	1	(Q,R)<R>
QR8001		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR8002		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR8003		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR8004		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR8005		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR8006		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR8007		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR8008		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR8009		UN1212	TRANSISTOR-RESISTOR	1	<R>
QR8011		UN1213	TRANSISTOR-RESISTOR	1	<R>
QR8012		UN1213	TRANSISTOR-RESISTOR	1	<R>
			RESISTORS		
R8001		ERDS2TJ223	CARBON 1/4W 22K	1	
R8002		ERDS2TJ683	CARBON 1/4W 68K	1	
R8003		ERDS2TJ102	CARBON 1/4W 1K	1	
R8004		ERDS2TJ102	CARBON 1/4W 1K	1	
R8005		ERDS2TJ102	CARBON 1/4W 1K	1	
R8006		ERDS2TJ104	CARBON 1/4W 100K	1	
R8007		ERDS2TJ102	CARBON 1/4W 1K	1	
R8008		ERDS2TJ822	CARBON 1/4W 8.2K	1	
R8009		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8010		ERDS2TJ105	CARBON 1/4W 1000K	1	
R8011		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R8012		ERDS2TJ103	CARBON 1/4W 10K	1	
R8013		ERDS2TJ103	CARBON 1/4W 10K	1	
R8014		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R8015		ERDS2TJ470	CARBON 1/4W 47	1	
R8016		ERDS2TJ333	CARBON 1/4W 33K	1	
R8017		ERDS2TJ182	CARBON 1/4W 1.8K	1	
R8018		ERDS2TJ822	CARBON 1/4W 8.2K	1	
R8019		ERDS2TJ102	CARBON 1/4W 1K	1	
R8020		ERDS2TJ103	CARBON 1/4W 10K	1	
R8021		ERDS2TJ103	CARBON 1/4W 10K	1	
R8022		ERDS2TJ333	CARBON 1/4W 33K	1	
R8023		ERDS2TJ563	CARBON 1/4W 56K	1	
R8024		ERDS2TJ563	CARBON 1/4W 56K	1	
R8025		ERDS2TJ223	CARBON 1/4W 22K	1	
R8026		ERDS2TJ123	CARBON 1/4W 12K	1	
R8027		ERDS2TJ104	CARBON 1/4W 100K	1	
R8028		ERDS2TJ104	CARBON 1/4W 100K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R8029		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R8030		ERDS2TJ273	CARBON 1/4W 27K	1	
R8031		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R8032		ERDS2TJ821	CARBON 1/4W 820	1	
R8033		ERDS2TJ102	CARBON 1/4W 1K	1	
R8034		ERDS2TJ102	CARBON 1/4W 1K	1	
R8035		ERDS2TJ471	CARBON 1/4W 470	1	
R8036		ERDS2TJ183	CARBON 1/4W 18K	1	
R8037		ERDS2TJ822	CARBON 1/4W 8.2K	1	
R8038		ERDS2TJ102	CARBON 1/4W 1K	1	
R8039		ERDS2TJ104	CARBON 1/4W 100K	1	
R8040		ERDS2TJ822	CARBON 1/4W 8.2K	1	
R8041		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8042		ERDS2TJ105	CARBON 1/4W 1000K	1	
R8043		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R8044		ERDS2TJ103	CARBON 1/4W 10K	1	
R8045		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R8046		ERDS2TJ103	CARBON 1/4W 10K	1	
R8047		ERDS2TJ470	CARBON 1/4W 47	1	
R8048		ERDS2TJ333	CARBON 1/4W 33K	1	
R8049		ERDS2TJ822	CARBON 1/4W 8.2K	1	
R8050		ERDS2TJ102	CARBON 1/4W 1K	1	
R8051		ERDS2TJ103	CARBON 1/4W 10K	1	
R8052		ERDS2TJ103	CARBON 1/4W 10K	1	
R8053		ERDS2TJ333	CARBON 1/4W 33K	1	
R8054		ERDS2TJ563	CARBON 1/4W 56K	1	
R8055		ERDS2TJ563	CARBON 1/4W 56K	1	
R8056		ERDS2TJ223	CARBON 1/4W 22K	1	
R8057		ERDS2TJ123	CARBON 1/4W 12K	1	
R8058		ERDS2TJ104	CARBON 1/4W 100K	1	
R8059		ERDS2TJ104	CARBON 1/4W 100K	1	
R8060		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R8061		ERDS2TJ102	CARBON 1/4W 1K	1	
R8062		ERDS2TJ273	CARBON 1/4W 27K	1	
R8063		ERDS2TJ472	CARBON 1/4W 4.7K	1	
R8064		ERDS2TJ821	CARBON 1/4W 820	1	
R8065		ERDS2TJ102	CARBON 1/4W 1K	1	
R8067		ERDS2TJ102	CARBON 1/4W 1K	1	
R8068		ERDS2TJ330	CARBON 1/4W 33	1	
R8069		ERDS2TJ103	CARBON 1/4W 10K	1	
R8070		ERDS2TJ103	CARBON 1/4W 10K	1	
R8071		ERDS2TJ560	CARBON 1/4W 56	1	
R8072		ERDS2TJ272	CARBON 1/4W 2.7K	1	
R8073		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R8074		ERDS2TJ102	CARBON 1/4W 1K	1	
R8075		ERDS2TJ331	CARBON 1/4W 330	1	
R8076		ERDS2TJ123	CARBON 1/4W 12K	1	
R8077		ERDS2TJ103	CARBON 1/4W 10K	1	
R8078		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R8079		ERDS2TJ103	CARBON 1/4W 10K	1	
R8080		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R8081		ERDS2TJ103	CARBON 1/4W 10K	1	
R8082		ERDS2TJ273	CARBON 1/4W 27K	1	
R8083		ERDS2TJ102	CARBON 1/4W 1K	1	
R8084		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8085		ERDS2TJ221	CARBON 1/4W 220	1	
R8086		ERDS2TJ102	CARBON 1/4W 1K	1	
R8087		ERDS2TJ102	CARBON 1/4W 1K	1	
R8088		ERDS2TJ102	CARBON 1/4W 1K	1	
R8089		ERDS2TJ273	CARBON 1/4W 27K	1	
R8090		ERDS2TJ223	CARBON 1/4W 22K	1	
R8091		ERDS2TJ102	CARBON 1/4W 1K	1	
R8092		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R8093		ERDS2TJ103	CARBON 1/4W 10K	1	
R8094		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R8095		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R8096		ERDS2TJ223	CARBON 1/4W 22K	1	
R8097		ERDS2TJ223	CARBON 1/4W 22K	1	
R8098		ERDS2TJ102	CARBON 1/4W 1K	1	
R8099		ERDS2TJ330	CARBON 1/4W 33	1	
R8100		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8101		ERDS2TJ561	CARBON 1/4W 560	1	
R8102		ERDS2TJ153	CARBON 1/4W 15K	1	
R8103		ERDS2TJ102	CARBON 1/4W 1K	1	
R8104		ERDS2TJ103	CARBON 1/4W 10K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R8105		ERDS2TJ471	CARBON 1/4W 470	1	
R8106		ERDS2TJ102	CARBON 1/4W 1K	1	
R8107		ERDS2TJ153	CARBON 1/4W 15K	1	
R8108		ERDS2TJ102	CARBON 1/4W 1K	1	
R8109		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8110		ERDS2TJ561	CARBON 1/4W 560	1	
R8111		ERDS2TJ561	CARBON 1/4W 560	1	
R8112		ERDS2TJ102	CARBON 1/4W 1K	1	
R8113		ERDS2TJ153	CARBON 1/4W 15K	1	
R8114		ERDS2TJ102	CARBON 1/4W 1K	1	
R8115		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8116		ERDS2TJ561	CARBON 1/4W 560	1	
R8117		ERDS2TJ102	CARBON 1/4W 1K	1	
R8118		ERDS2TJ471	CARBON 1/4W 470	1	
R8119		ERDS2TJ102	CARBON 1/4W 1K	1	
R8120		ERDS2TJ822	CARBON 1/4W 8.2K	1	
R8121		ERDS2TJ102	CARBON 1/4W 1K	1	
R8122		ERDS2TJ153	CARBON 1/4W 15K	1	
R8123		ERDS2TJ102	CARBON 1/4W 1K	1	
R8124		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8125		ERDS2TJ561	CARBON 1/4W 560	1	
R8126		ERDS2TJ102	CARBON 1/4W 1K	1	
R8127		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R8128		ERDS2TJ683	CARBON 1/4W 68K	1	
R8129		ERDS2TJ153	CARBON 1/4W 15K	1	
R8130		ERDS2TJ102	CARBON 1/4W 1K	1	
R8131		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8132		ERDS2TJ561	CARBON 1/4W 560	1	
R8133		ERDS2TJ561	CARBON 1/4W 560	1	
R8134		ERDS2TJ102	CARBON 1/4W 1K	1	
R8135		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R8136		ERDS2TJ153	CARBON 1/4W 15K	1	
R8137		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8138		ERDS2TJ561	CARBON 1/4W 560	1	
R8139		ERDS2TJ821	CARBON 1/4W 820	1	
R8140		ERDS2TJ102	CARBON 1/4W 1K	1	
R8141		ERDS2TJ471	CARBON 1/4W 470	1	
R8142		ERG1SJ470	METAL OXIDE 1W 47	1	
R8143		ERDS2TJ102	CARBON 1/4W 1K	1	
R8144		ERDS2TJ223	CARBON 1/4W 22K	1	
R8145		ERDS2TJ103	CARBON 1/4W 10K	1	
R8146		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R8147		ERDS2TJ103	CARBON 1/4W 10K	1	
R8148		ERDS2TJ392	CARBON 1/4W 3.9K	1	
R8149		ERDS2TJ561	CARBON 1/4W 560	1	
R8150		ERDS2TJ101	CARBON 1/4W 100	1	
R8151		ERDS2TJ103	CARBON 1/4W 10K	1	
R8152		ERDS2TJ223	CARBON 1/4W 22K	1	
R8153		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8154		ERDS2TJ103	CARBON 1/4W 10K	1	
R8155		ERDS2TJ471	CARBON 1/4W 470	1	
R8156		ERDS2TJ471	CARBON 1/4W 470	1	
R8157		ERDS2TJ471	CARBON 1/4W 470	1	
R8158		ERDS2TJ102	CARBON 1/4W 1K	1	
R8159		ERDS2TJ223	CARBON 1/4W 22K	1	
R8160		ERDS2TJ223	CARBON 1/4W 22K	1	
R8161		ERDS2TJ561	CARBON 1/4W 560	1	
R8162		ERDS2TJ333	CARBON 1/4W 33K	1	
R8163		ERDS2TJ223	CARBON 1/4W 22K	1	
R8164		ERDS2TJ223	CARBON 1/4W 22K	1	
R8165		ERDS2TJ102	CARBON 1/4W 1K	1	
R8166		ERDS2TJ271	CARBON 1/4W 270	1	
R8167		ERDS2TJ122	CARBON 1/4W 1.2K	1	
R8168		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R8169		ERDS2TJ332	CARBON 1/4W 3.3K	1	
R8170		ERDS2TJ561	CARBON 1/4W 560	1	
R8171		ERDS2TJ330	CARBON 1/4W 33	1	
R8172		ERDS2TJ222	CARBON 1/4W 2.2K	1	
R8173		ERDS2TJ153	CARBON 1/4W 15K	1	
R8174		ERDS2TJ270	CARBON 1/4W 27	1	
R8175		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8176		ERDS2TJ103	CARBON 1/4W 10K	1	
R8177		ERDS2TJ682	CARBON 1/4W 6.8K	1	
R8178		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R8179		ERDS2TJ471	CARBON 1/4W 470	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R8180		ERDS2TJ152	CARBON 1/4W 1.5K	1	
R8181		ERDS2TJ102	CARBON 1/4W 1K	1	
R8182		ERDS2TJ330	CARBON 1/4W 33	1	
R8183		ERDS2TJ154	CARBON 1/4W 150K	1	
R8184		ERDS2TJ154	CARBON 1/4W 150K	1	
R8185		ERDS2TJ101	CARBON 1/4W 100	1	
TH8001		ERTD2FHL102S	THERMISTOR 1K	1	
VR8001		EVM38GA00B24	VARIABLE 20K	1	
VR8002		EVM38GA00B24	VARIABLE 20K	1	
VR8003		EVM31GA00B13	VARIABLE 1K	1	
VR8004		EVM31GA00B23	VARIABLE 2K	1	
VR8005		EVM31GA00B23	VARIABLE 2K	1	
VR8006		EVM31GA00B23	VARIABLE 2K	1	
X8001		VSX0129A	CRYSTAL OSCILLATOR	1	
X8002		VSX0066	CRYSTAL OSCILLATOR	1	
			MISCELLANEOUS		
		VMP0905	SUPPORT	1	
	■	VEK3076	POCKET SWITCH C.B.UNIT		
SW6691		VSS0126	SWITCH	1	<R>
SW6692		VSS0126	SWITCH	1	<R>
SW6693		VSS0126	SWITCH	1	<R>
SW6694		VSS0126	SWITCH	1	<R>
SW6695		VSS0127	SWITCH	1	<R>
	■	VEP00G04A	EJECT C.B.A.		
D1		LN31GCPHL	LED	1	<R>
D2		LN31GCPHL	LED	1	<R>
D3		LN31GCPHL	LED	1	<R>
D4		LN41YCPHLM	LED	1	<R>
			RESISTORS		
R1		ERDS2TJ220	CARBON 1/4W 22	1	
R2		ERDS2TJ220	CARBON 1/4W 22	1	
R3		ERDS2TJ220	CARBON 1/4W 22	1	
R4		ERDS2TJ220	CARBON 1/4W 22	1	
SW1		EVQQJ104K	SWITCH	1	<R>
			MISCELLANEOUS		
		VMX0473	LED HOLDER	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
	■	VEP00G66A	METER C.B.A.		
			CAPACITORS		
C6311		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
D6311		LN440YCPUVT	DIODE	1	<R>
D6312		LN440YCPUVT	DIODE	1	<R>
D6313		LN440YCPUVT	DIODE	1	<R>
D6314		LN440YCPUVT	DIODE	1	<R>
D6315		LN440YCPUVT	DIODE	1	<R>
D6316		LN440YCPUVT	DIODE	1	<R>
D6317		LN440YCPUVT	DIODE	1	<R>
D6318		LN440YCPUVT	DIODE	1	<R>
D6319		LN440YCPUVT	DIODE	1	<R>
D6320		LN440YCPUVT	DIODE	1	<R>
D6321		LN440YCPUVT	DIODE	1	<R>
D6322		LN440YCPUVT	DIODE	1	<R>
D6323		LN440YCPUVT	DIODE	1	<R>
D6324		LN440YCPUVT	DIODE	1	<R>
D6325		LN440YCPUVT	DIODE	1	<R>
P6307		VJP1875T	CONNECTOR(MALE)	1	
P6310		VJP1873T	CONNECTOR(MALE)	1	
P6311		VJP1873T	CONNECTOR(MALE)	1	
			RESISTORS		
R6311		ERDS2TJ471	CARBON 1/4W 470	1	
R6312		ERDS2TJ471	CARBON 1/4W 470	1	
R6313		ERDS2TJ471	CARBON 1/4W 470	1	
R6314		ERDS2TJ331	CARBON 1/4W 330	1	
R6315		ERDS2TJ331	CARBON 1/4W 330	1	
R6316		ERDS2TJ331	CARBON 1/4W 330	1	
			MISCELLANEOUS		
		VGF0185	METER SPACER	3	
		VMX0861	LED SPACER	15	
	■	VEP00F76A	FRONT JACK C.B.A.		
			CAPACITORS		
C6601		ECEA1CKS470I	ELECTROLYTIC 16V 47U	1	
C6602		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C6603		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C6604		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C6605		ECEA1CKS470I	ELECTROLYTIC 16V 47U	1	
C6606		ECEA1CKS470I	ELECTROLYTIC 16V 47U	1	
C6607		ECEA1CKS470I	ELECTROLYTIC 16V 47U	1	
C6608		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C6609		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C6610		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C6611		ECUX1H102KBN	CHIP 50V 1000P	1	
C6612		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C6613		ECUX1H102KBN	CHIP 50V 1000P	1	
C6614		ECEA1CKS470I	ELECTROLYTIC 16V 47U	1	
C6615		ECEA1CKS470I	ELECTROLYTIC 16V 47U	1	
C6616		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C6617		ECEA1CKS470I	ELECTROLYTIC 16V 47U	1	
C6618		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
C6628		ECEA1CKS470I	ELECTROLYTIC 16V 47U	1	
C6629		ECEA1CKS470I	ELECTROLYTIC 16V 47U	1	
D6601		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D6602		MA165	DIODE	1	OR 1SS119, 1SS254<R>
D6603		MA165	DIODE	1	OR 1SS119, 1SS254<R>
IC6601		UPD4066BC	IC	1	<R>
IC6602		UPC4556C	IC	1	<R>
IC6603		TA7325P	IC	1	<R>
J01		ERJ6GEY0R00	CHIP 1/16W 0	1	
J02		ERJ6GEY0R00	CHIP 1/16W 0	1	
J03		ERJ6GEY0R00	CHIP 1/16W 0	1	
J04		ERJ6GEY0R00	CHIP 1/16W 0	1	
J05		ERJ6GEY0R00	CHIP 1/16W 0	1	
J06		ERJ6GEY0R00	CHIP 1/16W 0	1	
J07		ERJ6GEY0R00	CHIP 1/16W 0	1	
J08		ERJ6GEY0R00	CHIP 1/16W 0	1	
J09		ERJ6GEY0R00	CHIP 1/16W 0	1	
J10		ERJ6GEY0R00	CHIP 1/16W 0	1	
J11		ERJ6GEY0R00	CHIP 1/16W 0	1	
J12		ERJ6GEY0R00	CHIP 1/16W 0	1	
J13		ERJ6GEY0R00	CHIP 1/16W 0	1	
J14		ERJ6GEY0R00	CHIP 1/16W 0	1	
J15		ERJ6GEY0R00	CHIP 1/16W 0	1	
J16		ERJ6GEY0R00	CHIP 1/16W 0	1	
J17		ERJ6GEY0R00	CHIP 1/16W 0	1	
J18		ERJ6GEY0R00	CHIP 1/16W 0	1	
J19		ERJ6GEY0R00	CHIP 1/16W 0	1	
J20		ERJ6GEY0R00	CHIP 1/16W 0	1	
J21		ERJ6GEY0R00	CHIP 1/16W 0	1	
J22		ERJ6GEY0R00	CHIP 1/16W 0	1	
J23		ERJ6GEY0R00	CHIP 1/16W 0	1	
J24		ERJ6GEY0R00	CHIP 1/16W 0	1	
J25		ERJ6GEY0R00	CHIP 1/16W 0	1	
J26		ERJ6GEY0R00	CHIP 1/16W 0	1	
J27		ERJ6GEY0R00	CHIP 1/16W 0	1	
J28		ERJ6GEY0R00	CHIP 1/16W 0	1	
J29		ERJ6GEY0R00	CHIP 1/16W 0	1	
J30		ERJ6GEY0R00	CHIP 1/16W 0	1	
J31		ERJ6GEY0R00	CHIP 1/16W 0	1	
J32		ERJ6GEY0R00	CHIP 1/16W 0	1	
J33		ERJ6GEY0R00	CHIP 1/16W 0	1	
J34		ERJ6GEY0R00	CHIP 1/16W 0	1	
J35		ERJ6GEY0R00	CHIP 1/16W 0	1	
J36		ERJ6GEY0R00	CHIP 1/16W 0	1	
J37		ERJ6GEY0R00	CHIP 1/16W 0	1	
J38		ERJ6GEY0R00	CHIP 1/16W 0	1	
J39		ERJ6GEY0R00	CHIP 1/16W 0	1	
J40		ERJ6GEY0R00	CHIP 1/16W 0	1	
J41		ERJ6GEY0R00	CHIP 1/16W 0	1	
J42		ERJ6GEY0R00	CHIP 1/16W 0	1	
J43		ERJ6GEY0R00	CHIP 1/16W 0	1	
J44		ERJ6GEY0R00	CHIP 1/16W 0	1	
J45		ERJ6GEY0R00	CHIP 1/16W 0	1	
J46		ERJ6GEY0R00	CHIP 1/16W 0	1	
J47		ERJ6GEY0R00	CHIP 1/16W 0	1	
J48		ERJ6GEY0R00	CHIP 1/16W 0	1	
J49		ERJ6GEY0R00	CHIP 1/16W 0	1	
J50		ERJ6GEY0R00	CHIP 1/16W 0	1	
J51		ERJ6GEY0R00	CHIP 1/16W 0	1	
J52		ERJ6GEY0R00	CHIP 1/16W 0	1	
J53		ERJ6GEY0R00	CHIP 1/16W 0	1	
J54		ERJ6GEY0R00	CHIP 1/16W 0	1	
J55		ERJ6GEY0R00	CHIP 1/16W 0	1	
J56		ERJ6GEY0R00	CHIP 1/16W 0	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
J6601		VJJ0084	MIC JACK	1	
J6602		VJJ0084	MIC JACK	1	
J6603		VJJ0094	HEADPHONE JACK	1	
L6601		VLQEL05F102K	COIL 1000UH	1	
P6601		VJP1244T	CONNECTOR(MALE) 4P	1	
P6602		VJP1244G	CONNECTOR(MALE) 4P	1	
P6603		VJP1249T	CONNECTOR(MALE) 9P	1	
Q6601		2SD1330	TRANSISTOR	1	(R,S)<R>
Q6602		2SD1330	TRANSISTOR	1	(R,S)<R>
Q6603		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6604		2SD636	TRANSISTOR	1	(Q,R)<R>
Q6605		2SD636	TRANSISTOR	1	(Q,R)<R>
QR6601		UN1213	TRANSISTOR-RESISTOR	1	<R>
			RESISTORS		
R6601		ERJ6GEYJ393	CHIP 1/16W 39K	1	
R6602		ERJ6GEYJ683	CHIP 1/16W 68K	1	
R6603		ERJ6GEYJ393	CHIP 1/16W 39K	1	
R6604		ERJ6GEYJ683	CHIP 1/16W 68K	1	
R6605		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R6606		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R6607		ERJ6GEYJ224	CHIP 1/16W 220K	1	
R6608		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R6609		ERJ6GEYJ103	CHIP 1/16W 10K	1	
R6610		ERJ6GEYJ223	CHIP 1/16W 22K	1	
R6611		ERJ6GEYJ562	CHIP 1/16W 5.6K	1	
R6612		ERJ6GEYJ562	CHIP 1/16W 5.6K	1	
R6613		ERJ6GEYJ333	CHIP 1/16W 33K	1	
R6614		ERJ6GEYJ102	CHIP 1/16W 1K	1	
R6615		ERJ6GEYJ561	CHIP 1/16W 560	1	
R6616		ERJ6GEYJ470	CHIP 1/16W 47	1	
R6617		ERJ6GEYJ101	CHIP 1/16W 100	1	
R6618		ERJ6GEYJ333	CHIP 1/16W 33K	1	
R6619		ERJ6GEYJ102	CHIP 1/16W 1K	1	
R6620		ERJ6GEYJ561	CHIP 1/16W 560	1	
R6621		ERJ6GEYJ470	CHIP 1/16W 47	1	
R6622		ERJ6GEYJ101	CHIP 1/16W 100	1	
R6623		ERJ6GEYJ102	CHIP 1/16W 1K	1	
R6624		ERJ6GEYJ102	CHIP 1/16W 1K	1	
R6625		ERJ6GEYJ121	CHIP 1/16W 120	1	
R6626		ERJ6GEYJ102	CHIP 1/16W 1K	1	
R6627		ERJ6GEYJ102	CHIP 1/16W 1K	1	
R6628		ERJ6GEYJ121	CHIP 1/16W 120	1	
R6629		ERJ6GEYJ472	CHIP 1/16W 4.7K	1	
R6631		ERJ6GEYJ334	CHIP 1/16W 330K	1	
R6632		ERJ6GEYJ821	CHIP 1/16W 820	1	
R6637		ERJ6GEYJ472	CHIP 1/16W 4.7K	1	
R6638		ERJ6GEYJ102	CHIP 1/16W 1K	1	
R6639		ERJ6GEYJ474	CHIP 1/16W 470K	1	
R6640		ERJ6GEYJ821	CHIP 1/16W 820	1	
R6641		ERJ6GEYJ102	CHIP 1/16W 1K	1	
R6642		ERJ6GEYJ104	CHIP 1/16W 100K	1	
R6643		ERJ6GEYJ104	CHIP 1/16W 100K	1	
R6644		ERJ6GEYJ334	CHIP 1/16W 330K	1	
R6645		ERJ6GEYJ474	CHIP 1/16W 470K	1	
R6646		ERJ6GEYJ473	CHIP 1/16W 47K	1	
R6647		ERJ6GEYJ473	CHIP 1/16W 47K	1	
R6648		ERJ6GEYJ182	CHIP 1/16W 1.8K	1	
VR6601		EWKH1AY15B14	VARIABLE 10K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
	■	VEP00G67B	REAR JACK (3) C.B.A.		
			CAPACITORS		
C6422		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C6426		ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C6427		ECQB1H103JH	MYLAR 50V 0.01U	1	
C6461		ERDS2TJ273	CARBON 1/4W 27K	1	
L6412		VLQEL05F221K	COIL 220UH	1	
P6411		VJP1243G	CONNECTOR(MALE) 3P	1	
P6414		VJP1248R	CONNECTOR(MALE) 8P	1	
P6415		VJP1243T	CONNECTOR(MALE) 3P	1	
P6416		VJP1245T	CONNECTOR(MALE) 5P	1	
P6418		VJP1243T	CONNECTOR(MALE) 3P	1	
P6420		VJP1243B	CONNECTOR(MALE) 3P	1	
P6421		VJP1243T	CONNECTOR(MALE) 3P	1	
P6423		VJP1243R	CONNECTOR (MALE) 3P	1	
P6428		VJP1243B	CONNECTOR(MALE) 3P	1	
Q6416		2SD636	TRANSISTOR	1	(Q,R)<R>
			RESISTORS		
R6448		ERDS2TJ103	CARBON 1/4W 10K	1	
R6451		ERDS2TJ750	CARBON 1/4W 75	1	
R6452		ERDS2TJ750	CARBON 1/4W 75	1	
R6459		ERDS2TJ330	CARBON 1/4W 33	1	
R6460		ERDS2TJ102	CARBON 1/4W 1K	1	
R6462		ERDS2TJ223	CARBON 1/4W 22K	1	
SW6412		VES0244	SWITCH	1	<R>
SW6413		VES0244	SWITCH	1	<R>
SW6415		VES0244	SWITCH	1	<R>
	■	VEP00F79A	REAR JACK (2) C.B.A.		
			CAPACITORS		
C6413		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C6420		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C6421		ECEA1CK470	ELECTROLYTIC 16V 47U	1	
J6401		ERDS2T0	CARBON 1/4W 0	1	
J6402		ERDS2T0	CARBON 1/4W 0	1	
J6403		ERDS2T0	CARBON 1/4W 0	1	
J6404		ERDS2T0	CARBON 1/4W 0	1	
J6413		VJP1243B	CONNECTOR(MALE) 3P	1	
P6410		VJP1244R	CONNECTOR(MALE) 4P	1	
P6412		VJP1244G	CONNECTOR(MALE) 4P	1	
P6417		VJP1247T	CONNECTOR(MALE) 7P	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
P6419		VJP1243G	CONNECTOR(MALE) 3P	1	
P6422		VJP1245R	CONNECTOR(MALE) 5P	1	
P6424		VJP1243R	CONNECTOR (MALE) 3P	1	
P6425		VJP1243T	CONNECTOR(MALE) 3P	1	
P6427		VJP1243R	CONNECTOR (MALE) 3P	1	
Q6411		2SD1330	TRANSISTOR	1	(Q,R,S)<R>
Q6412		2SD1330	TRANSISTOR	1	(Q,R,S)<R>
Q6413		2SD1330	TRANSISTOR	1	(Q,R,S)<R>
Q6414		2SD1330	TRANSISTOR	1	(Q,R,S)<R>
Q6415		2SD1330	TRANSISTOR	1	(Q,R,S)<R>
			RESISTORS		
R6415		EROS2CKG4301	METAL OXIDE 1/4W 4.3K	1	
R6416		EROS2CKG4301	METAL OXIDE 1/4W 4.3K	1	
R6417		EROS2CKG4301	METAL OXIDE 1/4W 4.3K	1	
R6418		EROS2CKG4301	METAL OXIDE 1/4W 4.3K	1	
R6431		EROS2CKG5600	METAL OXIDE 1/4W 560	1	
R6433		ERDS2TJ103	CARBON 1/4W 10K	1	
R6434		EROS2CKG5600	METAL OXIDE 1/4W 560	1	
R6436		ERDS2TJ103	CARBON 1/4W 10K	1	
R6437		EROS2CKG5600	METAL OXIDE 1/4W 560	1	
R6438		ERDS2TJ563	CARBON 1/4W 56K	1	
R6439		ERDS2TJ103	CARBON 1/4W 10K	1	
R6440		EROS2CKG5600	METAL OXIDE 1/4W 560	1	
R6441		ERDS2TJ563	CARBON 1/4W 56K	1	
R6442		ERDS2TJ103	CARBON 1/4W 10K	1	
R6443		ERDS2TJ561	CARBON 1/4W 560	1	
R6444		ERDS2TJ563	CARBON 1/4W 56K	1	
R6445		ERDS2TJ103	CARBON 1/4W 10K	1	
R6449		ERDS2TJ561	CARBON 1/4W 560	1	
R6450		ERDS2TJ561	CARBON 1/4W 560	1	
R6453		ERDS2TJ750	CARBON 1/4W 75	1	
R6454		ERDS2TJ750	CARBON 1/4W 75	1	
R6455		ERDS2TJ750	CARBON 1/4W 75	1	
R6456		ERDS2TJ750	CARBON 1/4W 75	1	
SW6411		VES0244	SWITCH	1	<R>
SW6414		VES0244	SWITCH	1	<R>
	■	VEP00A31	FRONT CONNECTION C.B.A.		
		VJP1229B	CONNECTOR 2P	1	
		VJP1229T	CONNECTOR 2P	2	
		VJP1230T	CONNECTOR 3P	2	
		VJP1231T	CONNECTOR 4P	2	
		VJP1237T	CONNECTOR 10P	1	
		VJP1231B	CONNECTOR 4P	1	
	■	VEM0256	ELEVATOR UNIT		
		VJP1242R	CONNECTOR 2P	1	
		VJP1242T	CONNECTOR 2P	1	
		VJP1245T	CONNECTOR 5P	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
			MISCELLANEOUS		
E1		MXN12AE10C	FRONT LOADING MOTOR	1	<!><R>
E2		VMA6848	FRONT LOADING MOTOR PANEL	1	
			PRESSURE SOLENOID CONNECTION C.B.		
P6701		VJP1232R	CONNECTOR 5P	1	
P6702		VJP1231B	CONNECTOR 4P	1	
P6703		VJP1233T	CONNECTOR 6P	1	
P6704		VJP1230T	CONNECTOR 3P	1	
P6705		VJP1233R	CONNECTOR 6P	1	
P6706		VJP1148	CONNECTOR 2P	1	
P6707		VJP1229B	CONNECTOR 2P	1	
			TAKE-UP TENSION SENSOR C.B.		
QD6701		ON1108	TENSION SENSOR	1	<R>